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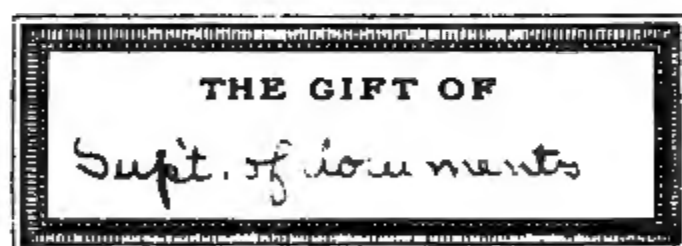
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THE
AMERICAN EPHEMERIS
AND
NAUTICAL ALMANAC

FOR THE YEAR

1913

PUBLISHED BY THE NAUTICAL ALMANAC OFFICE, U. S.
NAVAL OBSERVATORY, BY DIRECTION OF THE SECRETARY
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WASHINGTON
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1911

P R E F A C E.

The character of the matter contained in this issue of the American Ephemeris and Nautical Almanac, and its arrangement, are practically the same as in the preceding volume, that for the year 1912, excepting that ephemerides for observations of certain physical phenomena of the Sun and Moon and of the planets Mars and Jupiter, have been inserted in Part III.

The volume is divided into three parts, as follows:

Part I, *Ephemeris for the Meridian of Greenwich*, which gives the ephemerides of the Sun and Moon, the geocentric and heliocentric positions of the major planets, the Sun's coordinates, and other fundamental astronomical data for equidistant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington*, which gives ephemerides of the fixed stars, Sun, Moon, and major planets for transit over the meridian of the Naval Observatory, Washington, which passes midway between the West and East Transit Circles of the Observatory. The mean places of the fixed stars and the data for their reduction are also included in this part.

Part III, *Phenomena*, which contains predictions of phenomena to be observed, with data for their computation. Washington mean time for the meridian of the Naval Observatory is used throughout this part except in a few cases, notably those of eclipses, where Greenwich mean time seems more convenient. Tables for the determination of latitude and azimuth from Polaris, tables for the conversion of time, and an alphabetical list of observatories with their latitudes, longitudes, and other data, are contained in this part.

On November 2, 1910, when I assumed charge of the Nautical Almanac Office, the present volume, with the exception of about 35 pages, was in type, and the computations for these pages were either finished or well advanced. The entire volume was planned and the new matter, appearing in the Ephemeris for the first time with this volume, was selected by my predecessor, Professor Milton Updegraff, U. S. Navy. My connection with it has been confined to rearranging a few pages and writing up some of the explanatory matter.

W. S. EICHELBERGER,
Professor of Mathematics, U. S. Navy,
Director Nautical Almanac.

WASHINGTON, January, 1911.

ERRATA.

Ephemeris 1911, in some copies.

Page.				
261,	Dec. 33, Log. Dist.	for	9.9815309	read 9.9815313
265,	Dec. 31, Log. Dist.	for	9.8419039	read 9.8419042
308,	β Ursæ Minoris, Ann. Var.	for	-0.2096	read -0.2086
407,	Nov. 25, R. A. App. Noon	for	36.81	read 56.81
419,	Dec. 32, App. Decl.	for	23.1	read 23.5
425,	Dec. 31, App. R. A.	for	33.95	read 33.94
	Dec. 32, App. R. A.	for	42.70	read 42.65
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Ephemeris 1912, first edition.

VII,	Third from last line	for	-0.0376	read -0.000376
XIII,	Elements of the Planetary Orbits.	for	January 0	read January 1
XV,	Jewish era	for	5671	read 5673
	The Olympiads	for	second	read fourth
	Japanese era	for	43d	read 45th
213,	Second column	for	"	read '
238,	α^1 Geminorum, fifth column	for	4α	read 4δ
239,	Footnote, second column	for	ϵ Hydri	read ϵ Hydræ
243,	Thirty-eighth line	for	ζ Libræ	read 32 Libræ
	Thirty-eighth line, Mag.	for	5.6	read 5.9
319,	Last star	for	g^2 Eridani	read g Eridani
397,	η Ursæ Maj., $D\phi\delta$	for	-0.04	read -0.4
407,	γ Scorpii, $D'\phi\alpha$	for	+0.1	read +0.01
411,	First star	for	ζ^1 Libræ	read 32 Libræ
460,	First star	for	61^1 Cygni	read 61 Cygni <i>pr.</i>
465,	ϵ Pegasi, $D\phi\delta$	for	+0.03	read +0.3
67-70,	Second line	for	Jan. 0.764	read Jan. 1.006
570,	ϕ Aquarii, Proper Motion	for	-0.0043	read +0.0015
	ϕ Aquarii, Proper Motion	for	+0.091	read -0.194
610,	Synodic Period, Satellite VII	for	260.06	read 276.67
636,	Synodic Period, Satellite IX	for	580 4.7	read 580 2.9
645,	Note, Northern Elongation	for	Northern	read Southern
651,	Fifth line	for	West. Univ. Pa.	read Univ. of Pittsburgh
703,	First and twenty-first lines	for	$\rho \cos \phi$	read $\rho \cos \phi'$

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ANNIVERSARIES AND FESTIVALS, 1913.

New Year's Day	Wednesday, Jan. 1
Epiphany	Monday, Jan. 6
Septuagesima Sunday	Sunday, Jan. 19
Quinquagesima (Shrove Sunday)	Sunday, Feb. 2
Ash Wednesday	Wednesday, Feb. 5
Lincoln's Birthday	Wednesday, Feb. 12
Washington's Birthday	Saturday, Feb. 22
Palm Sunday	Sunday, Mar. 16
Good Friday	Friday, Mar. 21
Easter Sunday	Sunday, Mar. 23
First Day of Passover	Tuesday, Apr. 22
Rogation Sunday	Sunday, Apr. 27
Ascension Day (Holy Thursday)	Thursday, May 1
Pentecost (Whit Sunday)	Sunday, May 11
Trinity Sunday	Sunday, May 18
Corpus Christi	Thursday, May 22
Memorial Day	Friday, May 30
Hebrew Pentecost (Shebuoth)	Wednesday, June 11
Independence Day	Friday, July 4
Labor Day (except in certain States)	Monday, Sept. 1
Day of Atonement (Yom Kippur)	Saturday, Oct. 11
First Day of Tabernacle (Sucoth)	Thursday, Oct. 16
Election Day (in certain States)	Tuesday, Nov. 4
Thanksgiving Day	Thursday, Nov. 27
First Sunday in Advent	Sunday, Nov. 30
Christmas Day	Thursday, Dec. 25

INTRODUCTION.

The Ephemeris for the Meridian of Greenwich, comprising Part I of this volume, has been constructed from various tables of the Sun, Moon, and planets, as stated below, and the ephemerides of these bodies for the meridian of Washington contained in Part II have been computed from the same tables.

The Ephemeris of the Sun is constructed from Professor NEWCOMB'S *Tables of the Sun, Astronomical Papers of the American Ephemeris*, Vol. VI, part 1.

The adopted value of the mean equatorial horizontal parallax of the Sun is 8''.80, *Paris Conference, May, 1896*.

The Sun's rectangular equatorial coordinates are computed from the longitudes and latitudes by the following formulæ:

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3 R \beta \\ Z &= R \sin \lambda \sin \omega + 44.5 R \beta \end{aligned}$$

The reductions to mean equinox are computed by the formulæ—

$$\begin{aligned} \Delta X &= + Y \sec \omega \Delta \lambda \sin 1'' \\ \Delta Y &= - X \cos \omega \Delta \lambda \sin 1'' + Z \Delta \omega \sin 1'' + 9.1 \tau R \sin (\lambda + 6^\circ) \\ \Delta Z &= - X \sin \omega \Delta \lambda \sin 1'' - Y \Delta \omega \sin 1'' - 21.0 \tau R \sin (\lambda + 6^\circ) \end{aligned}$$

where the numerical coefficients are in units of the seventh place of decimals and

- R = the Sun's radius vector,
- λ = the Sun's true longitude,
- β = the Sun's true latitude, expressed in seconds of arc,
- ω = the obliquity of the ecliptic,
- $\Delta \lambda$ = the reduction of longitude for precession and nutation from the beginning of the Besselian fictitious year,
- $\Delta \omega$ = the reduction of the mean to the apparent obliquity,
- τ = the fraction of the year since the beginning of the Besselian fictitious year.

The longitude, latitude, and parallax of the Moon are derived from HANSEN'S *Tables de la Lune* (London, 1857), the mean longitude being corrected as in previous years, beginning with the volume for the year 1883. The statement concerning these corrections which is contained in the volumes from 1883 to 1911, inclusive, is erroneous, in that they have not been computed strictly in accordance with the formula in NEWCOMB'S *Researches on the Motion of the Moon*, part 1, page 268, *Washington Observations*, 1875, Appendix II. That formula is,

$$- 1''.14 - 29''.17 T - 3''.86 T^2 - V_2 - 0''.09 \sin A - 15''.49 \cos A,$$

while the expression actually used is,

$$- 1''.14 - 29''.17 T - 3''.76 T^2 - V_2 - 15''.49 \cos A.$$

In these formulæ T is the time in units of 100 years reckoned from 1800.

The ephemerides of Mercury, Venus, and Mars are derived from Professor NEWCOMB'S tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VI, parts 2, 3, and 4.

The ephemerides of Jupiter and Saturn are derived from the tables constructed in this office by Dr. GEORGE W. HILL, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 1 and 2.

The ephemerides of Uranus and Neptune are derived from Professor NEWCOMB'S tables of these planets, *Astronomical Papers of the American Ephemeris*, Vol. VII, parts 3 and 4.

The nutation used in computing the ephemerides of the Sun, Moon, and planets has been taken from Tables XXXII and XXXIII of NEWCOMB'S Tables of the Sun, *Astronomical Papers of the American Ephemeris*, Vol. VI, part 1, and is given at intervals of five days on page 214. The formulæ from which the nutation is computed are as follows, the time interval T being expressed in units of 100 years, reckoned from 1900. See *Tables of the Sun*, page 26.

$$\begin{aligned} \delta\psi &= -(17''.234 + 0''.017 T) \sin \Omega \\ &\quad + 0''.209 \sin 2 \Omega \\ &\quad - 1''.257 \sin 2 L \\ &\quad - 0''.049 \sin (3 L + 78^\circ.7) \\ &\quad + 0''.110 \sin (L + 75^\circ.3) \\ \delta\varepsilon &= +9''.214 \cos \Omega \\ &\quad - 0''.090 \cos 2 \Omega \\ &\quad + 0''.546 \cos 2 L \\ &\quad + 0''.021 \cos (3 L + 78^\circ.7) \\ &\quad - 0''.009 \cos (L - 78^\circ.7) \end{aligned}$$

The formulæ for the nutation used in computing the Besselian and Independent Star Numbers, pages 218–229, are as follows:

Terms of Long Period.	Terms of Short Period.
$\delta\psi = -(17''.234 + 0''.017 T) \sin \Omega$	$-0''.204 \sin 2 \mathcal{C}$
$+ 0''.209 \sin 2 \Omega$	$+ 0''.011 \sin (\mathcal{C} + \Gamma')$
$- 1''.272 \sin 2 L$	$+ 0''.068 \sin (\mathcal{C} - \Gamma')$
$+ 0''.126 \sin (L - \Gamma)$	$- 0''.034 \sin (2 \mathcal{C} - \Omega)$
$- 0''.050 \sin (3 L - \Gamma)$	$- 0''.026 \sin (3 \mathcal{C} - \Gamma')$
$+ 0''.021 \sin (L + \Gamma)$	$+ 0''.015 \sin (\mathcal{C} - 2 L + \Gamma')$
$+ 0''.012 \sin (2 L - \Omega)$	$+ 0''.006 \sin 2 (\mathcal{C} - L)$
$\delta\varepsilon = + (9''.210 + 0''.0009 T) \cos \Omega$	$+ 0''.088 \cos 2 \mathcal{C}$
$- 0''.090 \cos 2 \Omega$	$+ 0''.018 \cos (2 \mathcal{C} - \Omega)$
$+ 0''.552 \cos 2 L$	$+ 0''.011 \cos (3 \mathcal{C} - \Gamma')$
$+ 0''.022 \cos (3 L - \Gamma)$	$- 0''.005 \cos (\mathcal{C} + \Gamma')$
$- 0''.009 \cos (L + \Gamma)$	
$- 0''.007 \cos (2 L - \Omega)$	

The meaning of the symbols used and the manner in which these latter formulæ have been employed in computing the ephemerides of the stars, pages 251 to 510, are explained on pages 216 and 217. The slight discrepancy between the terms in $2 L$ in these two sets of formulæ is due to the correction of an error in the first set. See *Bulletin Astronomique*, 1898, Vol. XV, page 244.

The list of 825 stars contained in Part II has been selected from NEWCOMB'S Catalogue of Fundamental Stars, *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2. The mean places and annual variations of the stars have been taken from NEWCOMB'S Catalogue, except that those of ε Hydri, 38 Horologii (G.), and π Centauri have been taken from *Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33.

The relative accuracy with which the places of the stars are determined in both right ascension and declination may be estimated approximately from the mean errors for the year 1920, given on pages 511–517, and taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, part 2, pages 370–382.

The constants of aberration, precession, nutation, and obliquity of the ecliptic, used in the reduction of stars to apparent place, are given on pages 213 and 214, and the formulæ for the computation of the Besselian and Independent Star Numbers are given on page 216, the coefficients being those given by Professor NEWCOMB in *Bulletin Astronomique*, 1898, Vol. XV, page 241.

The terms of short period of the nutation depending on the Moon's mean longitude are tabulated for Washington mean midnight of each day on pages 231–232, and have been computed from the formulæ for these terms given above.

The method by which the right ascensions and declinations of the stars interpolated from the 10-day ephemerides (pp. 287–486) are corrected for the effect of these short-period terms is given on page 217.

According to the formulæ on pages 216 and 217 the star constants $a, b, c, d, a', b', c', d'$ are computed for each star from its mean place at the beginning of the year, but if strict accuracy is required they should be computed from the star's mean place at date, and the following second-order terms should be added to the usual expressions for the reduction from mean to apparent place, namely—

To $\alpha - \alpha_0$	To $\delta - \delta_0$
$\begin{aligned} & +0.000\ 003\ \tau^2 \sin \alpha \Big\} \tan \delta \\ & -0.000\ 149\ \tau^2 \cos \alpha \Big\} \\ & -0.000\ 0650\ \tau^2 \sin 2\alpha \Big\} \tan^2 \delta \\ & +0.000\ 0103\ \sin 2\ \odot \cos 2\alpha \Big\} \\ & -0.000\ 0107\ \cos 2\ \odot \sin 2\alpha \Big\} \\ & +0.000\ 0620\ \sin 2\ \odot \cos 2\alpha \Big\} \sec^2 \delta \\ & -0.000\ 0622\ \cos 2\ \odot \sin 2\alpha \Big\} \\ & +0.000\ 0513\ \sin (\odot + \odot) \cos 2\alpha \Big\} \tan \delta \sec \delta \\ & -0.000\ 0507\ \cos (\odot + \odot) \sin 2\alpha \Big\} \\ & +0.000\ 0097\ \sin (\odot - \odot) \cos 2\alpha \Big\} \\ & -0.000\ 0053\ \cos (\odot - \odot) \sin 2\alpha \Big\} \end{aligned}$	$\begin{aligned} & +0.000\ 975\ \tau^2 \sin^2 \alpha \Big\} \\ & -0.000\ 023\ \cos 2\ \odot \Big\} \\ & -0.000\ 080\ \cos 2\ \odot \cos 2\alpha \Big\} \tan \delta \\ & -0.000\ 077\ \sin 2\ \odot \sin 2\alpha \Big\} \\ & +0.000\ 040\ \cos 2\ \odot \Big\} \\ & -0.000\ 467\ \cos 2\ \odot \cos 2\alpha \Big\} \\ & -0.000\ 465\ \sin 2\ \odot \sin 2\alpha \Big\} \\ & -0.000\ 039\ \cos (\odot + \odot) \Big\} \\ & -0.000\ 380\ \cos (\odot + \odot) \cos 2\alpha \Big\} \sin \delta \tan \delta \\ & -0.000\ 385\ \sin (\odot + \odot) \sin 2\alpha \Big\} \\ & -0.000\ 380\ \cos (\odot - \odot) \Big\} \\ & -0.000\ 040\ \cos (\odot - \odot) \cos 2\alpha \Big\} \\ & -0.000\ 072\ \sin (\odot - \odot) \sin 2\alpha \Big\} \end{aligned}$

These terms are negligible for stars whose declination is numerically less than 80° , but in computing the apparent places given in the American Ephemeris they have been applied whenever sensible.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), α^2 Centauri, and 61 Cygni have been corrected for the effect of annual parallax, the adopted constants of parallax being $0''.38$, $0''.27$, $0''.75$, and $0''.40$, respectively.

The *apparent* places of α Canis Majoris (Sirius), α Canis Minoris (Procyon), and α^2 Centauri, have been corrected for the effect of orbital motion, as tabulated on pages 98 and 99 of *Veroeffentlichungen des Koeniglichen Astronomischen Rechen-Instituts zu Berlin*, 1907, No. 33. AUWER's elements were used for Sirius and Procyon, and SEE's elements for α^2 Centauri. The values of these corrections are—

	Sirius.		Procyon.		α^2 Centauri.	
	1913.0	1914.0	1913.0	1914.0	1913.0	1914.0
$\Delta\alpha$	$-0^s.223$	$-0^s.227$	$-0^s.048$	$-0^s.053$	$+0^s.686$	$+0^s.678$
$\Delta\delta$	$-0''.52$	$-0''.66$	$-0''.57$	$-0''.47$	$+7''.00$	$+6''.76$

[In former issues of the *American Ephemeris*, values differing from the above were used for Sirius and Procyon and no correction was applied to α^2 Centauri.] The *mean* places of these three stars as printed are those derived from NEWCOMB'S Fundamental Catalogue, without correction, and are assumed in each case to be the position of the center of gravity of the system.

The values of $\Delta\alpha$ and $\Delta\delta$ which are given for the companions to the stars γ Andromedæ, ζ Ursæ Majoris and 61 Cygni have been taken from the Greenwich 10-year catalogue for 1890, those for α Crucis from the Cape Catalogue for 1900, and those for α^2 Geminorum from DOBERCK'S elements in the *Astronomische Nachrichten*, 1904, Vol. 166, page 145.

The magnitudes of the stars have, with a few exceptions, been taken from *Annals of the Harvard College Observatory*, Vol. L., 1908.

In general, the names of the stars are the same as in NEWCOMB'S Suggested List of Fundamental Stars, except that the Flamsteed number has been omitted in all cases where Greek or italic letters are available. In some cases the constellation and number of the uranometries of Heis or Gould have been used. In all such cases, Heis or the letter G in parentheses follows the constellation name, as, for example, 5 Cassiopeiæ (Heis) and 38 Horologii (G.).

The stars occulted by the moon, pages 566–569, have been selected from the catalogue of zodiacal stars contained in Vol. VIII, part 3, *Astronomical Papers of the American Ephemeris*, and the mean places for 1913.0 have been derived from the same catalogue.

In Part III the elements of eclipses of the Sun and occultations of stars by the Moon are given in accordance with BESSEL'S method, the special forms employed being a modification of those developed in CHAUVENET'S *Spherical and Practical Astronomy*.

In the computation of the elements of Eclipses, the following corrections to the longitude, latitude, and parallax of the Moon, as given on pages V–XII of the Greenwich Ephemeris, deduced by the late Prof. SIMON NEWCOMB from recent observations of occultations of stars by the Moon, have been applied. These corrections have been assumed in each case to be constant during the eclipse.

G. M. T.	δv	δb	$\delta \pi$
1913	"	"	"
Mar. 22 ^d 0 ^h	+ 8.4	+ 1.0	+ 0.4
Apr. 6 7	+ 10.4	+ 0.9	+ 0.4
Aug. 31 8	+ 8.6	+ 1.1	+ 0.3
Sept. 15 0	+ 9.0	+ 0.7	+ 0.3
Sept. 29 18	+ 8.6	+ 0.5	+ 0.3

The satellites of Mars are computed from manuscript tables based upon elements deduced by Prof. WALTER S. HARSHMAN, U. S. N.

The eclipses of Jupiter's satellites are computed from a *Continuation of DAMOISEAU'S Tables*. The occultations, transits, etc., are computed from WOOLHOUSE'S tables, published in the *British Nautical Almanac* for 1835; Table II of each satellite having been adapted to DAMOISEAU'S tables.

The Vth satellite of Jupiter is computed from manuscript tables based upon unpublished elements deduced from the observations of Prof. E. E. BARNARD.

The differential coordinates of Jupiter's VIth and VIIth satellites have been computed from elements and tables published in *Lick Observatory Bulletin*, 1906, Vol. IV, No. 112, and in *Astronomische Nachrichten*, 1907, Vol. 174, page 359, respectively.

The elongations and conjunctions of the satellites and the positions of the rings of Saturn are computed from manuscript tables based on Prof. H. STRUVE's elements as published in *Beobachtungen der Saturnstrabanten*, Supplement 1, Pul-kowa Observations, St. Petersburg, 1888. The differential coordinates of Phœbe have been computed from elements and tables printed in the *Annals of Harvard College Observatory*, 1905, Vol. LIII, No. VI.

The apparent dimensions of the rings of Saturn are computed from BESSEL's data, except those for the dusky ring, which are based on the observations of various astronomers.

The elongations of the satellites of Uranus are computed from the data of Professor NEWCOMB's *Uranian and Neptunian Systems*, Washington Observations, 1873, Appendix I.

The elongations of the satellite of Neptune are computed from manuscript tables based upon the late Prof. A. HALL's elements published in the *Astronomical Journal*, 1898, Vol. XIX, page 65.

The adopted apparent semidiameter of the Sun at the Earth's mean distance is $16' 1''.50$; while in the computation of eclipses the value given by AUWERS in the *Astronomische Nachrichten*, 1891, Vol. 128, page 367, is employed, viz, $15' 59''.63$.

In the computation of the ephemeris for physical observations of the Sun, page 607, the following elements by CARRINGTON have been used:

Inclination of the Sun's equator to the ecliptic	$7^{\circ} 15'$
Longitude of the ascending node of the Sun's equator on the ecliptic	$73^{\circ} 40' + 50''.25 (t - 1850)$
Sidereal period of rotation (mean solar days)	$25^d.38$

The apparent semidiameter of the Moon is computed from the Moon's equatorial horizontal parallax, π , by the formula,

$$S = 0.272\ 506\ \pi + 1''.50$$

where the constant 0.272 506 is based on data from occultations given by Mr. J. PETERS in the *Astronomische Nachrichten*, 1895, Vol. 138, page 147; and the constant $1''.50$ is added to cover the average effect of irradiation.

The value of the Moon's semidiameter employed in the computation of eclipses is computed from the formula,

$$S = 0.272\ 274\ \pi$$

The ephemeris for physical observations of the Moon, pages 608–615 has been computed from formulæ and elements given by F. HAYN in *Abhandlungen der K. Sächsischen Gesell. der Wissenschaften*, Vols. 29 and 30, 1904, 1907.

The notation used for the geocentric librations of the Moon is as follows:

I = the mean inclination of the Moon's equator to the ecliptic ($= 1^{\circ} 32'.1$),

Ω = the mean longitude of the Moon's ascending node, or the mean longitude of the descending node of the Moon's equator,

C = the angle at the center of the Moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk,

$\lambda, \beta, \alpha, \delta$ = the geocentric longitude, latitude, right ascension, and declination of the Moon,

$\lambda, \beta, \alpha, \delta$ = the quantities defined on page 212, where their values for the current year are given,

g' = Earth's mean anomaly,

g = Moon's mean anomaly,

ω = Angular distance of Moon's perigee from the ascending node,

b, l = Optical librations in latitude and longitude, respectively,

$\delta b, \delta l$ = Physical librations in latitude and longitude, respectively,

δC = Physical libration of C .

The Moon's geocentric librations in longitude and latitude or, in other words, the earth's selenographic longitude and latitude, are equal to $l + \delta l$ and $b + \delta b$, respectively, and may be

found, for any time, by means of the following formulæ, in connection with the tables given on pages 212 and 213:—

$$\begin{aligned}\mu &= -0'.617 \sin 2 (\Omega - \lambda) \\ A &= \sin I \cos (\Omega - \lambda) \\ \tan B &= \tan I \sin (\Omega - \lambda) \\ \lambda' &= \lambda + \mu + Ab \\ b &= B - \beta \\ l &= \lambda' - \zeta \\ \sin C &= \sin i \frac{\cos (\lambda' + \Delta - \Omega)}{\cos \delta} = - \sin i \frac{\cos (\alpha - \Omega')}{\cos b} \\ \delta b &= + 108'' \sin (\omega + l) + 37'' \sin (\omega - l) - 11'' \sin (g + \omega - l) \\ \delta l &= + 12'' \sin g - 59'' \sin g' - 18'' \sin 2\omega \\ &\quad - [108'' \cos (\omega + l) - 37'' \cos (\omega - l) + 11'' \cos (g + \omega - l)] \tan b \\ \delta C &= - [108'' \cos (\omega + l) - 37'' \cos (\omega - l) + 11'' \cos (g + \omega - l)] \sec b\end{aligned}$$

The Sun's selenographic latitude and longitude have been computed from formulæ the same as those given above except that the heliocentric coordinates of the Moon have been substituted for the geocentric coordinates.

The following elements have been used in computing the ephemerides for physical observations of the planets Mars and Jupiter:

Position of north pole of Mars	$\left\{ \begin{aligned} \alpha &= 21^h 10^m 0^s + 1^s.565(t-1905) \\ \delta &= 54^\circ 30' 0'' + 12''.60(t-1905) \end{aligned} \right.$
Position of north pole of Jupiter	$\left\{ \begin{aligned} \alpha &= 17^h 52^m 0^s.84 + 0^s.247(t-1910) \\ \delta &= 64^\circ 33' 34''.6 - 0''.60(t-1910) \end{aligned} \right.$
Rotation period of Mars	$24^h 37^m 22^s.65$
Rotation period of Jupiter	$\left\{ \begin{aligned} \text{Equatorial region} & 9^h 50^m 30^s.004 \\ \text{Great Red Spot} & 9^h 55^m 40^s.340 \end{aligned} \right.$
Longitude of Central Meridian of Mars, May 15, 1897, Greenwich Mean Noon	$52^\circ.01$
Longitude of Central Meridian of Jupiter (Equatorial Region), July 14, 1897, Greenwich Mean Noon	$47^\circ.31$
Longitude of Great Red Spot from Central Meridian of Jupiter, January 1, 1908, Greenwich Mean Noon	$120^\circ.49$

The position of the north pole of Mars is as given by LOWELL and CROMMELIN (see *Monthly Notices R. A. S.*, 1905, Vol. 66, page 56), while that of the north pole of Jupiter has been deduced from the position given by DAMOISEAU for 1750 (see *Tables Écliptiques des Satellites de Jupiter*, page (1)). The rotation periods of Mars and of the equatorial region of Jupiter and the longitudes of the central meridians of Mars and of the equatorial region of Jupiter are according to MARTH (see *Monthly Notices R. A. S.*, 1896, Vol. 56, pages 395-403 and 517-524). The rotation period of the Great Red Spot of Jupiter is a recent value by BARNARD, and its longitude from the Central Meridian is deduced from observations by BARNARD published in *Astronomische Nachrichten*, 1908, Vol. 178, page 390.

The adopted semidiameters of the planets are given on page xv, and their stellar magnitudes have been computed from formulæ given by Dr. G. MUELLER in *Publicationen des Astrophysikalischen Observatoriums zu Potsdam*, 1893, Vol. 8, page 366.

In the list of observatories, pages 670-679, the latitudes given are in most cases astronomical. In some instances they have been determined by geodetic triangulation from other points. The reductions from geographic to geocentric latitude, $\varphi' - \varphi$, and the distance from the center of the earth, ρ , are computed from the formulæ for CLARKE'S Spheroid of 1866 as given on page xiv.

CHRONOLOGICAL ERAS AND CYCLES.

CHRONOLOGICAL ERAS.

THE YEAR 1913, WHICH COMPRISES THE LATTER PART OF THE 137TH AND THE BEGINNING OF THE 138TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6626 of the Julian Period;

- “ 7421–7422 of the Byzantine era, the year 7422 commencing on September 1;
- “ 5673–5674 of the Jewish era, the year 5674 commencing on October 2, or, more exactly, at sunset on October 1;
- “ 2666 since the foundation of Rome, according to VARRO;
- “ 2660 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding, in the notation of chronologists, to the 747th, and, in the notation of astronomers, to the 746th year before the birth of CHRIST;
- “ 2689 of the Olympiads, or the first year of the 673d Olympiad, commencing in July, 1913, if we fix the era of the Olympiads at $775\frac{1}{2}$ years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period;
- “ 2225 of the Grecian era, or the era of the SELEUCIDÆ, which began near the vernal equinox of the year, $-311 = \text{B. C. } 312, = 4402$ of the Julian Period;
- “ 1629 of the era of DIOCLETIAN;
- “ 2573 of the Japanese era and to the 46th year of the period entitled “Meiji.”

The year 1332 of the Mohammedan era, or the era of the Hegira, begins on the 30th day of November, 1913.

The first day of January of the year 1913 is the 2,419,769th day since the commencement of the Julian Period.

CHRONOLOGICAL CYCLES.

Minical Letter	E	Solar Cycle	18
Indiction	22	Roman Indiction	11
Solar Cycle or Golden Number	14	Julian Period	6626

ASTRONOMICAL CONSTANTS.

Solar Parallax	8.80	} Paris Conference.
Constant of Nutation	9.21	
Constant of Aberration	20.47	
General Precession	$50''.2564 + 0''.000\ 222(t-1900)$	} Newcomb.
Obliquity of the Ecliptic	$23^\circ\ 27'\ 8''.26 - 0''.4684(t-1900)$	
Equatorial Horizontal Parallax of the Moon	$57'\ 2''.63^*$	(Newcomb).
Mean distance Earth to Moon	384 395 kilometers = 238 851 miles, or 60.2669 radii.	
Mean distance Earth to Sun	149 499 935 kilometers = 92 894 767 statute miles.	
Velocity of light	299 860 kilometers = 186 324 statute miles per second (Newcomb and Michelson).	

Light travels unit distance in $498^s.566$.

Gaussian Gravitation Constant, $\dagger k = 0.017\ 202\ 099 = 3\ 548''.187\ 61$.

Acceleration in one sec. due to gravity, $g = 9.8060 - 0.0260 \cos 2\varphi - \frac{2h}{R} g.\dagger$	} Helmert.
Length of seconds pendulum, $l = 0.993\ 549 - 0.002\ 631 \cos 2\varphi - \frac{2h}{R} l.\dagger$	

Length of the year:

Tropical (ordinary)	$365.242\ 198\ 79 - 0.000\ 000\ 0614(t-1900)$	} Newcomb.
Sidereal	$365.256\ 360\ 42 + 0.000\ 000\ 0011(t-1900)$	
Anomalistic	$365.259\ 641\ 34 + 0.000\ 000\ 0304(t-1900)$	
Eclipse	$346.620\ 000 + 0.000\ 000\ 36(t-1900)$	

Length of the month:

Synodical (ordinary)	$29.530\ 588 = 29\ 12\ 44\ 2.8$	} Hansen.
Tropical	$27.321\ 582 = 27\ 7\ 43\ 4.7$	
Sidereal	$27.321\ 661 = 27\ 7\ 43\ 11.5$	
Anomalistic	$27.554\ 550 = 27\ 13\ 18\ 33.1$	
Nodical	$27.212\ 219 = 27\ 5\ 5\ 35.7$	

Length of the day:

Sidereal	$23\ 56\ 4.091$ of mean solar time.
Mean Solar	$24\ 3\ 56.555$ of sidereal time.

Dimensions of the Earth (Clarke's Spheroid of 1866):

Equatorial Radius, $a = 6378.206$ kilometers or 3963.23 statute miles.
Polar Radius, $b = 6356.584$ " or 3949.79 " "

Flattening, $\frac{a-b}{a} = \frac{1}{295.0}$

Logarithm of the eccentricity $\frac{\sqrt{a^2-b^2}}{a} = \log e = 8.915\ 251\ 28$

Logarithm radius = $\log \rho = 9.999\ 2645 + 0.000\ 7374 \cos 2\varphi - 0.000\ 0019 \cos 4\varphi$.

Reduction from geographic latitude φ to geocentric latitude φ' ,

$$\varphi' - \varphi = -11'\ 40''.44 \sin 2\varphi + 1''.19 \sin 4\varphi.$$

1 meter = 3.280 8333 feet. 1 foot = 0.304 8006 meters.

1 statute mile = 0.868 392 nautical or geographical miles.

1 nautical mile = 1.151 553 statute miles.

* Used in the computation of eclipses. The parallax used in the computation of the ephemeris of the Moon contained in this volume is $57'\ 2''.23$ (Hansen).

† k^2 is the acceleration due to the Sun's attraction at the mean distance of the Earth from the Sun, which is also the astronomical unit of distance, the unit of time being one mean solar day.

‡ φ = latitude, h = elevation above sea level in meters, and $\log R = 6.80416$.

ASTRONOMICAL CONSTANTS.

SEMIDIAMETERS OF THE SUN, MOON, AND PLANETS.

Name.	At unit Distance. " "	At mean least Distance. " "	In Kilo-meters.	In Statute Miles.	Authority.
Sun	15 59.63	. .	695 533.61	432 183.68	Auwers.
Moon	15 32.58*	. .	1 737.96	1 079.91	Newcomb.
Mercury	3.34	5.45	2 420.82	1 504.24	Le Verrier.
Venus	8.55	30.90	6 197.01	3 850.67	Peirce.
Mars	5.05	9.64	3 660.22	2 274.37	Peirce.
Jupiter (Equatorial) . . .	1 40.20	23.84	72 624.56	45 127.16	Am. Eph.
Jupiter (Polar)	1 34.12	22.40	68 217.80	42 388.90	Peirce.
Saturn (Equatorial)	1 24.88	9.94	61 520.69	38 227.48	Barnard.
Saturn (Polar)	1 17.47	9.07	56 149.95	34 890.23	Barnard.
Uranus	33.52	1.84	24 295.16	15 096.43	Am. Eph.
Neptune	38.66	1.33	28 020.61	17 411.34	Am. Eph.

ELEMENTS OF THE PLANETARY ORBITS FOR THE EPOCH 1913—January 0^d G. M. T.

Name.	Mean Dis-tance.	Sidereal Period.	Mean daily Motion. "	Synodic Period.	Eccen-tricity.
☿ Mercury	0.387 099	0.240 85	14 732.420	0.317 26	0.205 6169
♀ Venus	0.723 331	0.615 21	5 767.670	1.598 72	0.006 8145
⊕ Earth	1.000 000	1.000 04	3 548.193	. . .	0.016 7456
♂ Mars	1.523 688	1.880 89	1 886.519	2.135 39	0.093 3207
♃ Jupiter	5.202 803	11.862 23	299.128	1.092 11	0.048 3586
♄ Saturn	9.538 843	29.457 72	120.455	1.035 18	0.055 8447
♅ Uranus	19.190 978	84.015 29	42.23	1.012 09	0.047 0809
♆ Neptune	30.070 672	164.788 29	21.53	1.006 14	0.008 5415

Name.	Inclina-tion to the Ecliptic. ° ' "	Mean Longi-tude of the Node. ° ' "	Mean Longi-tude of the Perihelion. ° ' "	Mean Longi-tude at the Epoch. ° ' "	Logarithm of Mass in unit of Sun's Mass.
☿ Mercury	7 0 11.2	47 18 0.0	76 6 6.9	168 47 6.67	3.221 8487—10
♀ Venus	3 23 37.5	75 53 47.8	130 20 48.7	29 51 50.61	4.389 3398—10
⊕ Earth . . . . .	. . .	. . .	101 26 39.6	99 33 0.81	4.482 2896—10
♂ Mars	1 51 1.0	48 53 10.3	334 27 28.1	262 2 14.99	3.509 5499—10
♃ Jupiter	1 18 28.9	99 34 9.6	12 55 15.9	272 44 54.03	6.979 9082—10
♄ Saturn	2 29 30.4	112 53 49.1	91 20 36.5	65 36 47.08	6.455 7335—10
♅ Uranus	0 46 21.8	73 33 20.4	169 15 23.6	299 14 48.27	5.640 7528—10
♆ Neptune	1 46 40.8	130 49 18.4	43 52 9.2	113 36 21.82	5.705 5338—10

The elements of the four inner planets are derived from those given by Newcomb in Vol. VI of the Astronomical Papers of the American Ephemeris, and are the same as those used in computing the ephemerides of these planets. Those of Jupiter, Saturn, Uranus, and Neptune are taken from Vol. VII of the Astronomical Papers for the epoch of the tables. They are reduced to 1913 by applying Le Verrier's variations, and can not be regarded as being strictly identical with the elements used in computing the ephemerides of those planets in this volume.

* At mean distance. See Ast. Papers Am. Eph., Vol. IX, p. 40. For the values of the semidiameter used in this volume see page xi.

SYMBOLS AND ABBREVIATIONS.

SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♁	The Earth.	♆	Neptune.

SIGNS OF THE ZODIAC.

Spring Signs.	{	1.	♈	Aries.	Autumn Signs.	{	7.	♎	Libra.
		2.	♉	Taurus.			8.	♏	Scorpius.
		3.	♊	Gemini.			9.	♐	Sagittarius.
Summer Signs.	{	4.	♋	Cancer.	Winter Signs.	{	10.	♑	Capricornus.
		5.	♌	Leo.			11.	♒	Aquarius.
		6.	♍	Virgo.			12.	♓	Pisces.

ASPECTS.

- ♌ Conjunction, or having the same Longitude or Right Ascension.
- ☐ Quadrature, or differing $\pm 90^\circ$ in Longitude or Right Ascension.
- ♌ Opposition, or differing 180° in Longitude or Right Ascension.

ABBREVIATIONS.

♌	Ascending Node.	°	Degrees.
♍	Descending Node.	'	Minutes of Arc.
N.	North.	"	Seconds of Arc.
S.	South.	h	Hours.
E.	East.	m	Minutes of Time.
W.	West.	s	Seconds of Time.

PART I.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Wed.	1	18 45 41.24	11.050	S. 23 2 14.8	+12.06	16 17.89	71.06	3 33.52	1.187
Thur.	2	18 50 6.25	11.035	22 57 11.7	13.20	16 17.89	71.02	4 1.89	1.175
Fri.	3	18 54 30.93	11.020	22 51 41.1	14.34	16 17.88	70.97	4 29.93	1.161
Sat.	4	18 58 55.25	11.005	22 45 43.2	+15.48	16 17.87	70.92	4 57.61	1.145
SUN.	5	19 3 19.17	10.988	22 39 18.1	16.61	16 17.85	70.86	5 24.91	1.128
Mon.	6	19 7 42.66	10.969	22 32 26.0	17.73	16 17.83	70.80	5 51.78	1.110
Tues.	7	19 12 5.70	10.949	22 25 7.2	+18.84	16 17.81	70.73	6 18.18	1.090
Wed.	8	19 16 28.25	10.928	22 17 21.8	19.94	16 17.78	70.66	6 44.09	1.069
Thur.	9	19 20 50.27	10.905	22 9 10.0	21.03	16 17.75	70.59	7 9.49	1.046
Fri.	10	19 25 11.74	10.882	22 0 32.1	+22.11	16 17.72	70.52	7 34.34	1.023
Sat.	11	19 29 32.64	10.858	21 51 28.5	23.18	16 17.68	70.44	7 58.61	0.999
SUN.	12	19 33 52.94	10.832	21 41 59.4	24.24	16 17.63	70.36	8 22.28	0.973
Mon.	13	19 38 12.60	10.805	21 32 5.0	+25.29	16 17.58	70.28	8 45.32	0.946
Tues.	14	19 42 31.60	10.778	21 21 45.7	26.32	16 17.52	70.19	9 7.71	0.919
Wed.	15	19 46 49.94	10.749	21 11 1.8	27.34	16 17.46	70.10	9 29.42	0.891
Thur.	16	19 51 7.59	10.720	20 59 53.5	+28.35	16 17.40	70.01	9 50.45	0.862
Fri.	17	19 55 24.52	10.690	20 48 21.2	29.34	16 17.34	69.91	10 10.78	0.832
Sat.	18	19 59 40.72	10.660	20 36 25.3	30.32	16 17.27	69.81	10 30.38	0.801
SUN.	19	20 3 56.19	10.629	20 24 6.1	+31.28	16 17.19	69.71	10 49.23	0.770
Mon.	20	20 8 10.90	10.597	20 11 24.0	32.23	16 17.10	69.61	11 7.33	0.739
Tues.	21	20 12 24.85	10.565	19 58 19.2	33.17	16 17.01	69.50	11 24.67	0.707
Wed.	22	20 16 38.03	10.533	19 44 52.0	+34.09	16 16.91	69.40	11 41.25	0.675
Thur.	23	20 20 50.44	10.501	19 31 2.9	35.00	16 16.81	69.29	11 57.06	0.643
Fri.	24	20 25 2.07	10.468	19 16 52.2	35.90	16 16.70	69.18	12 12.09	0.611
Sat.	25	20 29 12.91	10.435	19 2 20.3	+36.77	16 16.58	69.07	12 26.34	0.578
SUN.	26	20 33 22.97	10.402	18 47 27.4	37.63	16 16.46	68.96	12 39.80	0.545
Mon.	27	20 37 32.24	10.369	18 32 13.9	38.48	16 16.34	68.85	12 52.48	0.512
Tues.	28	20 41 40.73	10.336	18 16 40.2	+39.31	16 16.20	68.74	13 4.37	0.479
Wed.	29	20 45 48.42	10.303	18 0 46.7	40.13	16 16.06	68.62	13 15.47	0.446
Thur.	30	20 49 55.30	10.270	17 44 33.8	40.93	16 15.92	68.51	13 25.77	0.413
Fri.	31	20 54 1.37	10.236	17 28 1.9	41.72	16 15.78	68.39	13 35.26	0.379
Sat.	32	20 58 6.64	10.202	S. 17 11 11.3	+42.49	16 15.63	68.28	13 43.94	0.346

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.19 from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

k. of	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
d.	1	18 45 40.58	11.046	S. 23 2 15.5	+12.05	3 33.45	1.187	18 42 7.14
ir.	2	18 50 5.50	11.032	22 57 12.6	13.19	4 1.81	1.175	18 46 3.69
	3	18 54 30.10	11.017	22 51 42.2	14.33	4 29.85	1.161	18 50 0.25
	4	18 58 54.34	11.002	22 45 44.5	+15.47	4 57.53	1.145	18 53 56.81
N.	5	19 3 18.18	10.985	22 39 19.6	16.60	5 24.81	1.128	18 57 53.37
l.	6	19 7 41.60	10.966	22 32 27.7	17.72	5 51.67	1.110	19 1 49.93
s.	7	19 12 4.56	10.946	22 25 9.1	+18.83	6 18.07	1.090	19 5 46.49
d.	8	19 16 27.03	10.925	22 17 23.9	19.93	6 43.98	1.069	19 9 43.05
ir.	9	19 20 48.97	10.903	22 9 12.4	21.02	7 9.37	1.046	19 13 39.60
	10	19 25 10.37	10.880	22 0 34.9	+22.10	7 34.21	1.023	19 17 36.16
	11	19 29 31.20	10.856	21 51 31.6	23.17	7 58.47	0.999	19 21 32.72
N.	12	19 33 51.43	10.830	21 42 2.8	24.23	8 22.14	0.973	19 25 29.28
	13	19 38 11.02	10.803	21 32 8.7	+25.27	8 45.18	0.946	19 29 25.84
s.	14	19 42 29.96	10.776	21 21 49.7	26.30	9 7.57	0.919	19 33 22.40
d.	15	19 46 48.24	10.747	21 11 6.1	27.32	9 29.28	0.891	19 37 18.96
ir.	16	19 51 5.83	10.718	20 59 58.1	+28.33	9 50.31	0.862	19 41 15.51
	17	19 55 22.71	10.688	20 48 26.2	29.32	10 10.63	0.832	19 45 12.07
	18	19 59 38.86	10.658	20 36 30.7	30.30	10 30.23	0.801	19 49 8.63
N.	19	20 3 54.28	10.627	20 24 11.8	+31.26	10 49.09	0.770	19 53 5.19
n.	20	20 8 8.94	10.595	20 11 30.0	32.21	11 7.19	0.739	19 57 1.74
s.	21	20 12 22.84	10.563	19 58 25.5	33.15	11 24.54	0.707	20 0 58.30
	22	20 16 35.98	10.531	19 44 58.7	+34.07	11 41.13	0.675	20 4 54.86
ir.	23	20 20 48.35	10.499	19 31 9.9	34.98	11 56.94	0.643	20 8 51.42
	24	20 24 59.94	10.467	19 16 59.5	35.88	12 11.97	0.611	20 12 47.98
	25	20 29 10.75	10.434	19 2 27.9	+36.76	12 26.22	0.578	20 16 44.53
N.	26	20 33 20.78	10.401	18 47 35.3	37.62	12 39.69	0.545	20 20 41.09
l.	27	20 37 30.02	10.368	18 32 22.2	38.47	12 52.38	0.512	20 24 37.65
s.	28	20 41 38.47	10.335	18 16 48.8	+39.30	13 4.27	0.479	20 28 34.20
d.	29	20 45 46.13	10.302	18 0 55.6	40.12	13 15.37	0.446	20 32 30.76
ir.	30	20 49 52.99	10.269	17 44 43.0	40.92	13 25.67	0.413	20 36 27.32
	31	20 53 59.05	10.236	17 28 11.3	41.71	13 35.17	0.379	20 40 23.88
	32	20 58 4.30	10.202	S. 17 11 20.9	+42.48	13 43.86	0.346	20 44 20.43

RE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,
+9^s.8565.
(Table III.)

1885

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 41.1	15 36.2	57 28.11	−1.541	57 9.91	−1.490	19 49.6	2.04	23.8
2	15 31.4	15 26.8	56 52.36	1.433	56 35.52	1.371	20 39.5	2.12	24.8
3	15 22.4	15 18.2	56 19.43	1.309	56 4.09	1.246	21 31.6	2.21	25.8
4	15 14.3	15 10.5	55 49.50	−1.185	55 35.64	−1.125	22 25.4	2.26	26.8
5	15 6.9	15 3.5	55 22.49	1.065	55 10.08	1.002	23 19.6	2.24	27.8
6	15 0.3	14 57.4	54 58.44	0.937	54 47.61	0.866	0	.	28.8
7	14 54.7	14 52.2	54 37.65	−0.793	54 28.61	−0.712	0 12.6	2.16	0.1
8	14 50.0	14 48.1	54 20.60	0.621	54 13.74	0.521	1 3.0	2.04	1.1
9	14 46.6	14 45.5	54 8.15	0.410	54 3.95	0.288	1 50.1	1.89	2.1
10	14 44.8	14 44.5	54 1.29	−0.154	54 0.31	−0.007	2 34.0	1.77	3.1
11	14 44.7	14 45.5	54 1.17	+0.153	54 4.02	+0.324	3 15.4	1.68	4.1
12	14 46.9	14 48.8	54 8.99	0.505	54 16.20	0.697	3 55.0	1.63	5.1
13	14 51.4	14 54.7	54 25.75	+0.894	54 37.69	+1.095	4 34.1	1.63	6.1
14	14 58.6	15 3.2	54 52.06	1.299	55 8.86	1.501	5 13.7	1.68	7.1
15	15 8.4	15 14.3	55 28.06	1.698	55 49.56	1.884	5 55.3	1.79	8.1
16	15 20.7	15 27.7	56 13.20	+2.053	56 38.73	+2.199	6 40.0	1.95	9.1
17	15 35.1	15 42.8	57 5.87	2.319	57 34.24	2.403	7 29.4	2.17	10.1
18	15 50.7	15 58.7	58 3.37	2.442	58 32.67	2.433	8 24.4	2.41	11.1
19	16 6.6	16 14.2	59 1.54	+2.372	59 29.32	+2.249	9 25.0	2.63	12.1
20	16 21.2	16 27.6	59 55.27	2.066	60 18.67	1.824	10 29.7	2.73	13.1
21	16 33.1	16 37.5	60 38.80	1.526	60 55.08	1.180	11 35.2	2.70	14.1
22	16 40.8	16 42.7	61 6.97	+0.797	61 14.11	+0.390	12 38.4	2.54	15.1
23	16 43.3	16 42.6	61 16.32	−0.022	61 13.60	−0.428	13 37.2	2.35	16.1
24	16 40.5	16 37.3	61 6.14	0.811	60 54.27	1.161	14 31.4	2.18	17.1
25	16 33.0	16 27.8	60 38.49	−1.463	60 19.40	−1.711	15 22.1	2.06	18.1
26	16 21.9	16 15.4	59 57.66	1.905	59 33.92	2.044	16 10.5	1.99	19.1
27	16 8.6	16 1.5	59 8.84	2.129	58 43.03	2.165	16 58.3	2.00	20.1
28	15 54.4	15 47.5	58 17.05	−2.160	57 51.36	−2.116	17 46.6	2.04	21.1
29	15 40.7	15 34.1	57 26.36	2.046	57 2.37	1.951	18 36.3	2.11	22.1
30	15 27.9	15 22.1	56 39.63	1.838	56 18.31	1.714	19 28.0	2.19	23.1
31	15 16.7	15 11.8	55 58.53	1.582	55 40.33	1.450	20 21.2	2.24	24.1
32	15 7.2	15 3.1	55 23.73	−1.317	55 8.73	−1.184	21 15.1	2.24	25.1

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 5.					TUESDAY 7.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	17 26 45.96	2.3455	S.28 4 38.2	2.479	0	19 17 57.01	2.2496	S.27 11 55.5	4.524
1	17 29 6.70	2.3458	28 7 2.4	2.327	1	19 20 11.86	2.2454	27 7 20.1	4.657
2	17 31 27.46	2.3462	28 9 17.5	2.176	2	19 22 26.46	2.2412	27 2 36.7	4.789
3	17 33 48.24	2.3463	28 11 23.5	2.024	3	19 24 40.80	2.2369	26 57 45.4	4.920
4	17 36 9.02	2.3464	28 13 20.4	1.872	4	19 26 54.89	2.2326	26 52 46.3	5.049
5	17 38 29.81	2.3464	28 15 8.2	1.721	5	19 29 8.71	2.2281	26 47 39.5	5.178
6	17 40 50.59	2.3462	28 16 46.9	1.569	6	19 31 22.26	2.2236	26 42 24.9	5.307
7	17 43 11.36	2.3460	28 18 16.5	1.417	7	19 33 35.54	2.2191	26 37 2.6	5.435
8	17 45 32.11	2.3457	28 19 37.0	1.267	8	19 35 48.55	2.2146	26 31 32.7	5.562
9	17 47 52.85	2.3453	28 20 48.5	1.115	9	19 38 1.29	2.2099	26 25 55.2	5.687
10	17 50 13.55	2.3448	28 21 50.8	0.962	10	19 40 13.74	2.2052	26 20 10.3	5.811
11	17 52 34.22	2.3441	28 22 44.0	0.812	11	19 42 25.91	2.2004	26 14 17.9	5.936
12	17 54 54.84	2.3432	28 23 28.2	0.661	12	19 44 37.79	2.1956	26 8 18.0	6.059
13	17 57 15.41	2.3424	28 24 3.3	0.509	13	19 46 49.38	2.1908	26 2 10.8	6.181
14	17 59 35.93	2.3415	28 24 29.3	0.358	14	19 49 0.69	2.1860	25 55 56.3	6.302
15	18 1 56.39	2.3404	28 24 46.3	0.208	15	19 51 11.70	2.1811	25 49 34.6	6.422
16	18 4 16.78	2.3392	28 24 54.3	-0.057	16	19 53 22.42	2.1761	25 43 5.7	6.541
17	18 6 37.09	2.3378	28 24 53.2	+0.092	17	19 55 32.83	2.1711	25 36 29.7	6.659
18	18 8 57.32	2.3365	28 24 43.1	0.243	18	19 57 42.95	2.1662	25 29 46.6	6.777
19	18 11 17.47	2.3350	28 24 24.0	0.392	19	19 59 52.77	2.1611	25 22 56.5	6.893
20	18 13 37.52	2.3333	28 23 56.0	0.542	20	20 2 2.28	2.1560	25 15 59.5	7.008
21	18 15 57.47	2.3317	28 23 19.0	0.692	21	20 4 11.49	2.1509	25 8 55.6	7.122
22	18 18 17.32	2.3298	28 22 33.0	0.840	22	20 6 20.39	2.1457	25 1 44.8	7.236
23	18 20 37.05	2.3279	S.28 21 38.2	0.988	23	20 8 28.98	2.1407	S.24 54 27.3	7.348
MONDAY 6.					WEDNESDAY 8.				
0	18 22 56.67	2.3259	S.28 20 34.4	1.137	0	20 10 37.27	2.1355	S.24 47 3.0	7.460
1	18 25 16.16	2.3237	28 19 21.8	1.284	1	20 12 45.24	2.1302	24 39 32.1	7.570
2	18 27 35.52	2.3216	28 18 0.3	1.432	2	20 14 52.90	2.1251	24 31 54.6	7.679
3	18 29 54.75	2.3192	28 16 30.0	1.578	3	20 17 0.25	2.1198	24 24 10.6	7.787
4	18 32 13.83	2.3167	28 14 50.9	1.724	4	20 19 7.28	2.1146	24 16 20.1	7.896
5	18 34 32.76	2.3142	28 13 3.1	1.869	5	20 21 14.00	2.1094	24 8 23.1	8.002
6	18 36 51.53	2.3116	28 11 6.6	2.014	6	20 23 20.41	2.1041	24 0 19.8	8.107
7	18 39 10.15	2.3090	28 9 1.3	2.159	7	20 25 26.49	2.0988	23 52 10.2	8.212
8	18 41 28.61	2.3062	28 6 47.4	2.304	8	20 27 32.26	2.0936	23 43 54.4	8.315
9	18 43 46.89	2.3032	28 4 24.8	2.448	9	20 29 37.72	2.0883	23 35 32.4	8.417
10	18 46 4.99	2.3002	28 1 53.6	2.591	10	20 31 42.86	2.0830	23 27 4.3	8.519
11	18 48 22.91	2.2972	27 59 13.9	2.733	11	20 33 47.68	2.0777	23 18 30.1	8.619
12	18 50 40.65	2.2940	27 56 25.6	2.876	12	20 35 52.18	2.0724	23 9 50.0	8.718
13	18 52 58.19	2.2907	27 53 28.8	3.017	13	20 37 56.37	2.0672	23 1 3.9	8.817
14	18 55 15.53	2.2873	27 50 23.6	3.157	14	20 40 0.24	2.0618	22 52 12.0	8.914
15	18 57 32.67	2.2840	27 47 10.0	3.297	15	20 42 3.79	2.0566	22 43 14.2	9.011
16	18 59 49.61	2.2805	27 43 48.0	3.436	16	20 44 7.03	2.0513	22 34 10.7	9.106
17	19 2 6.33	2.2768	27 40 17.7	3.574	17	20 46 9.95	2.0461	22 25 1.5	9.200
18	19 4 22.83	2.2732	27 36 39.1	3.712	18	20 48 12.56	2.0409	22 15 46.7	9.293
19	19 6 39.11	2.2694	27 32 52.2	3.850	19	20 50 14.86	2.0357	22 6 26.3	9.386
20	19 8 55.16	2.2656	27 28 57.1	3.987	20	20 52 16.84	2.0304	21 57 0.4	9.477
21	19 11 10.98	2.2617	27 24 53.8	4.122	21	20 54 18.51	2.0252	21 47 29.0	9.567
22	19 13 26.57	2.2577	27 20 42.4	4.257	22	20 56 19.87	2.0201	21 37 52.3	9.657
23	19 15 41.91	2.2537	27 16 23.0	4.391	23	20 58 20.92	2.0149	21 28 10.2	9.746
24	19 17 57.01	2.2496	S.27 11 55.5	4.524	24	21 0 21.66	2.0097	S.21 18 22.8	9.832

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT

AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 21.					THURSDAY 23.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	7 6 1.65	2.7803	N.27 36 11.7	4.753	0	9 14 30.95	2.5268	N.20 4 32.0	13.426
1	7 8 48.42	2.7787	27 31 20.1	4.966	1	9 17 2.34	2.5194	19 51 2.4	13.560
2	7 11 35.09	2.7768	27 26 15.8	5.177	2	9 19 33.28	2.5121	19 37 24.8	13.692
3	7 14 21.64	2.7747	27 20 58.8	5.388	3	9 22 3.79	2.5048	19 23 39.4	13.820
4	7 17 8.06	2.7724	27 15 29.2	5.598	4	9 24 33.86	2.4974	19 9 46.4	13.946
5	7 19 54.33	2.7698	27 9 47.0	5.808	5	9 27 3.48	2.4900	18 55 45.9	14.070
6	7 22 40.44	2.7672	27 3 52.2	6.017	6	9 29 32.66	2.4827	18 41 38.0	14.192
7	7 25 26.39	2.7643	26 57 45.0	6.224	7	9 32 1.41	2.4754	18 27 22.9	14.311
8	7 28 12.16	2.7612	26 51 25.3	6.432	8	9 34 29.71	2.4680	18 13 0.7	14.428
9	7 30 57.74	2.7579	26 44 53.2	6.637	9	9 36 57.57	2.4607	17 58 31.5	14.543
10	7 33 43.11	2.7544	26 38 8.8	6.842	10	9 39 24.99	2.4534	17 43 55.5	14.655
11	7 36 28.27	2.7508	26 31 12.2	7.045	11	9 41 51.98	2.4462	17 29 12.9	14.765
12	7 39 13.21	2.7470	26 24 3.4	7.248	12	9 44 18.53	2.4389	17 14 23.7	14.873
13	7 41 57.91	2.7429	26 16 42.4	7.450	13	9 46 44.65	2.4317	16 59 28.1	14.978
14	7 44 42.36	2.7387	26 9 9.4	7.649	14	9 49 10.33	2.4244	16 44 26.3	15.081
15	7 47 26.56	2.7344	26 1 24.5	7.848	15	9 51 35.58	2.4172	16 29 18.4	15.182
16	7 50 10.49	2.7299	25 53 27.7	8.046	16	9 54 0.40	2.4102	16 14 4.5	15.280
17	7 52 54.15	2.7252	25 45 19.0	8.242	17	9 56 24.80	2.4032	15 58 44.8	15.375
18	7 55 37.52	2.7204	25 36 58.6	8.437	18	9 58 48.78	2.3962	15 43 19.5	15.468
19	7 58 20.60	2.7154	25 28 26.6	8.630	19	10 1 12.34	2.3891	15 27 48.6	15.560
20	8 1 3.37	2.7103	25 19 43.0	8.822	20	10 3 35.47	2.3821	15 12 12.3	15.649
21	8 3 45.84	2.7052	25 10 48.0	9.012	21	10 5 58.19	2.3752	14 56 30.7	15.737
22	8 6 27.99	2.6998	25 1 41.6	9.200	22	10 8 20.50	2.3684	14 40 43.9	15.821
23	8 9 9.81	2.6942	N.24 52 24.0	9.387	23	10 10 42.40	2.3616	N.14 24 52.2	15.902
WEDNESDAY 22.					FRIDAY 24.				
0	8 11 51.29	2.6885	N.24 42 55.2	9.572	0	10 13 3.89	2.3548	N.14 8 55.7	15.982
1	8 14 32.43	2.6827	24 33 15.4	9.755	1	10 15 24.98	2.3482	13 52 54.4	16.059
2	8 17 13.22	2.6768	24 23 24.6	9.937	2	10 17 45.67	2.3416	13 36 48.6	16.133
3	8 19 53.65	2.6708	24 13 22.9	10.117	3	10 20 5.97	2.3350	13 20 38.4	16.206
4	8 22 33.72	2.6647	24 3 10.5	10.295	4	10 22 25.87	2.3285	13 4 23.9	16.277
5	8 25 13.42	2.6585	23 52 47.5	10.471	5	10 24 45.39	2.3221	12 48 5.2	16.345
6	8 27 52.74	2.6522	23 42 14.0	10.645	6	10 27 4.52	2.3157	12 31 42.5	16.411
7	8 30 31.68	2.6457	23 31 30.1	10.817	7	10 29 23.28	2.3095	12 15 15.9	16.475
8	8 33 10.23	2.6392	23 20 35.9	10.987	8	10 31 41.66	2.3032	11 58 45.5	16.536
9	8 35 48.39	2.6327	23 9 31.6	11.156	9	10 33 59.67	2.2971	11 42 11.6	16.594
10	8 38 26.16	2.6261	22 58 17.2	11.323	10	10 36 17.31	2.2910	11 25 34.2	16.652
11	8 41 3.52	2.6192	22 46 52.8	11.487	11	10 38 34.59	2.2850	11 8 53.4	16.707
12	8 43 40.47	2.6124	22 35 18.7	11.649	12	10 40 51.51	2.2791	10 52 9.4	16.759
13	8 46 17.01	2.6056	22 23 34.9	11.809	13	10 43 8.08	2.2733	10 35 22.3	16.816
14	8 48 53.14	2.5987	22 11 41.6	11.967	14	10 45 24.31	2.2676	10 18 32.2	16.858
15	8 51 28.85	2.5916	21 59 38.8	12.124	15	10 47 40.19	2.2618	10 1 39.3	16.903
16	8 54 4.13	2.5845	21 47 26.7	12.277	16	10 49 55.73	2.2562	9 44 43.8	16.947
17	8 56 38.99	2.5775	21 35 5.5	12.428	17	10 52 10.94	2.2507	9 27 45.6	16.990
18	8 59 13.43	2.5704	21 22 35.3	12.577	18	10 54 25.82	2.2453	9 10 45.0	17.029
19	9 1 47.44	2.5632	21 9 56.2	12.725	19	10 56 40.38	2.2400	8 53 42.1	17.067
20	9 4 21.01	2.5559	20 57 8.3	12.870	20	10 58 54.62	2.2347	8 36 36.9	17.103
21	9 6 54.15	2.5487	20 44 11.8	13.012	21	11 1 8.54	2.2295	8 19 29.7	17.137
22	9 9 26.85	2.5414	20 31 6.8	13.152	22	11 3 22.16	2.2245	8 2 20.5	17.168
23	9 11 59.12	2.5342	20 17 53.5	13.290	23	11 5 35.48	2.2195	7 45 9.5	17.197
24	9 14 30.95	2.5268	N.20 4 32.0	13.426	24	11 7 48.50	2.2146	N. 7 27 56.8	17.225

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 25.					MONDAY 27.				
0	11 7 48.50	2.2146	N. 7 27 56.8	17.225	0	12 50 13.77	2.0888	S. 6 16 14.3	16.492
1	11 10 1.23	2.2097	7 10 42.5	17.251	1	12 52 19.09	2.0885	6 32 42.3	16.440
2	11 12 13.67	2.2050	6 53 26.7	17.274	2	12 54 24.39	2.0882	6 49 7.1	16.386
3	11 14 25.83	2.2004	6 36 9.6	17.296	3	12 56 29.67	2.0879	7 5 28.6	16.331
4	11 16 37.72	2.1958	6 18 51.2	17.317	4	12 58 34.94	2.0877	7 21 46.8	16.275
5	11 18 49.34	2.1914	6 1 31.6	17.334	5	13 0 40.20	2.0877	7 38 1.6	16.217
6	11 21 0.69	2.1871	5 44 11.1	17.349	6	13 2 45.47	2.0878	7 54 12.9	16.158
7	11 23 11.78	2.1828	5 26 49.7	17.363	7	13 4 50.74	2.0879	8 10 20.6	16.099
8	11 25 22.62	2.1787	5 9 27.5	17.376	8	13 6 56.02	2.0881	8 26 24.7	16.038
9	11 27 33.22	2.1746	4 52 4.6	17.386	9	13 9 1.31	2.0883	8 42 25.2	15.976
10	11 29 43.57	2.1706	4 34 41.2	17.394	10	13 11 6.62	2.0887	8 58 21.9	15.912
11	11 31 53.69	2.1667	4 17 17.3	17.401	11	13 13 11.96	2.0892	9 14 14.7	15.847
12	11 34 3.57	2.1628	3 59 53.1	17.405	12	13 15 17.32	2.0897	9 30 3.6	15.782
13	11 36 13.23	2.1592	3 42 28.7	17.408	13	13 17 22.72	2.0902	9 45 48.5	15.714
14	11 38 22.67	2.1556	3 25 4.1	17.409	14	13 19 28.15	2.0909	10 1 29.3	15.646
15	11 40 31.90	2.1521	3 7 39.6	17.408	15	13 21 33.63	2.0917	10 17 6.0	15.577
16	11 42 40.92	2.1487	2 50 15.1	17.407	16	13 23 39.15	2.0924	10 32 38.5	15.507
17	11 44 49.74	2.1453	2 32 50.8	17.403	17	13 25 44.72	2.0933	10 48 6.8	15.435
18	11 46 58.36	2.1421	2 15 26.8	17.397	18	13 27 50.35	2.0943	11 3 30.7	15.362
19	11 49 6.79	2.1390	1 58 3.2	17.389	19	13 29 56.04	2.0953	11 18 50.2	15.287
20	11 51 15.04	2.1360	1 40 40.1	17.379	20	13 32 1.79	2.0963	11 34 5.2	15.212
21	11 53 23.11	2.1330	1 23 17.7	17.368	21	13 34 7.60	2.0975	11 49 15.7	15.137
22	11 55 31.00	2.1302	1 5 55.9	17.357	22	13 36 13.49	2.0987	12 4 21.6	15.059
23	11 57 38.73	2.1274	N. 0 48 34.9	17.343	23	13 38 19.45	2.1001	S. 12 19 22.8	14.981
SUNDAY 26.					TUESDAY 28.				
0	11 59 46.29	2.1247	N. 0 31 14.8	17.326	0	13 40 25.50	2.1015	S. 12 34 19.3	14.901
1	12 1 53.70	2.1222	N. 0 13 55.8	17.308	1	13 42 31.63	2.1029	12 49 10.9	14.820
2	12 4 0.96	2.1197	S. 0 3 22.2	17.290	2	13 44 37.85	2.1045	13 3 57.7	14.738
3	12 6 8.07	2.1173	0 20 39.0	17.268	3	13 46 44.17	2.1061	13 18 39.5	14.655
4	12 8 15.04	2.1151	0 37 54.4	17.246	4	13 48 50.58	2.1077	13 33 16.3	14.571
5	12 10 21.88	2.1129	0 55 8.5	17.222	5	13 50 57.09	2.1093	13 47 48.0	14.487
6	12 12 28.59	2.1108	1 12 21.1	17.197	6	13 53 3.70	2.1111	14 2 14.6	14.401
7	12 14 35.18	2.1088	1 29 32.1	17.170	7	13 55 10.42	2.1129	14 16 36.1	14.313
8	12 16 41.65	2.1069	1 46 41.5	17.142	8	13 57 17.25	2.1147	14 30 52.3	14.225
9	12 18 48.01	2.1052	2 3 49.2	17.112	9	13 59 24.19	2.1167	14 45 3.1	14.136
10	12 20 54.27	2.1034	2 20 55.0	17.081	10	14 1 31.25	2.1187	14 59 8.6	14.046
11	12 23 0.42	2.1017	2 37 58.9	17.047	11	14 3 38.43	2.1207	15 13 8.6	13.955
12	12 25 6.48	2.1002	2 55 0.7	17.012	12	14 5 45.74	2.1228	15 27 3.2	13.862
13	12 27 12.45	2.0988	3 12 0.4	16.977	13	14 7 53.17	2.1249	15 40 52.2	13.769
14	12 29 18.34	2.0975	3 28 58.0	16.941	14	14 10 0.73	2.1272	15 54 35.5	13.675
15	12 31 24.15	2.0962	3 45 53.3	16.902	15	14 12 8.43	2.1294	16 8 13.1	13.579
16	12 33 29.88	2.0949	4 2 46.2	16.861	16	14 14 16.26	2.1317	16 21 45.0	13.483
17	12 35 35.54	2.0939	4 19 36.6	16.819	17	14 16 24.23	2.1340	16 35 11.1	13.386
18	12 37 41.15	2.0930	4 36 24.5	16.777	18	14 18 32.34	2.1364	16 48 31.3	13.287
19	12 39 46.70	2.0921	4 53 9.8	16.733	19	14 20 40.60	2.1388	17 1 45.6	13.188
20	12 41 52.20	2.0912	5 9 52.4	16.687	20	14 22 49.00	2.1413	17 14 53.9	13.088
21	12 43 57.65	2.0905	5 26 32.3	16.640	21	14 24 57.56	2.1439	17 27 56.2	12.987
22	12 46 3.06	2.0898	5 43 9.3	16.592	22	14 27 6.27	2.1464	17 40 52.4	12.885
23	12 48 8.43	2.0892	5 59 43.3	16.542	23	14 29 15.13	2.1490	17 53 42.4	12.782
24	12 50 13.77	2.0888	S. 6 16 14.3	16.492	24	14 31 24.15	2.1517	S. 18 6 26.2	12.677

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.																				
WEDNESDAY 29.					FRIDAY 31.																								
0	14 31 24.15	2.1517	S. 18 6 26.2	12.677	0	16 18 1.47	2.2887	S. 25 58 44.8	6.707																				
1	14 33 33.33	2.1543	18 19 3.7	12.572	1	16 20 18.86	2.2910	26 5 23.0	6.566																				
2	14 35 42.67	2.1570	18 31 34.9	12.467	2	16 22 36.39	2.2933	26 11 52.7	6.423																				
3	14 37 52.17	2.1597	18 43 59.8	12.361	3	16 24 54.06	2.2955	26 18 13.8	6.281																				
4	14 40 1.84	2.1625	18 56 18.2	12.252	4	16 27 11.85	2.2977	26 24 26.4	6.138																				
5	14 42 11.67	2.1652	19 8 30.1	12.144	5	16 29 29.78	2.2998	26 30 30.4	5.995																				
6	14 44 21.67	2.1681	19 20 35.5	12.034	6	16 31 47.83	2.3018	26 36 25.8	5.852																				
7	14 46 31.84	2.1710	19 32 34.2	11.923	7	16 34 6.00	2.3037	26 42 12.6	5.708																				
8	14 48 42.19	2.1739	19 44 26.3	11.812	8	16 36 24.28	2.3057	26 47 50.8	5.563																				
9	14 50 52.71	2.1767	19 56 11.7	11.700	9	16 38 42.68	2.3076	26 53 20.2	5.417																				
10	14 53 3.40	2.1797	20 7 50.3	11.587	10	16 41 1.19	2.3093	26 58 40.9	5.272																				
11	14 55 14.27	2.1826	20 19 22.1	11.472	11	16 43 19.80	2.3111	27 3 52.9	5.127																				
12	14 57 25.31	2.1855	20 30 47.0	11.357	12	16 45 38.52	2.3128	27 8 56.2	4.982																				
13	14 59 36.53	2.1885	20 42 5.0	11.242	13	16 47 57.34	2.3144	27 13 50.7	4.835																				
14	15 1 47.93	2.1915	20 53 16.1	11.126	14	16 50 16.25	2.3158	27 18 36.4	4.687																				
15	15 3 59.51	2.1945	21 4 20.1	11.008	15	16 52 35.24	2.3172	27 23 13.2	4.540																				
16	15 6 11.27	2.1975	21 15 17.1	10.890	16	16 54 54.31	2.3186	27 27 41.2	4.393																				
17	15 8 23.21	2.2006	21 26 6.9	10.771	17	16 57 13.47	2.3199	27 32 0.4	4.246																				
18	15 10 35.34	2.2036	21 36 49.6	10.651	18	16 59 32.70	2.3211	27 36 10.7	4.097																				
19	15 12 47.64	2.2066	21 47 25.0	10.530	19	17 1 52.00	2.3222	27 40 12.1	3.949																				
20	15 15 0.13	2.2097	21 57 53.2	10.408	20	17 4 11.36	2.3232	27 44 4.6	3.801																				
21	15 17 12.80	2.2127	22 8 14.0	10.286	21	17 6 30.79	2.3242	27 47 48.2	3.652																				
22	15 19 25.65	2.2157	22 18 27.5	10.162	22	17 8 50.27	2.3251	27 51 22.9	3.503																				
23	15 21 38.69	2.2188	S. 22 28 33.5	10.038	23	17 11 9.80	2.3258	S. 27 54 48.6	3.354																				
THURSDAY 30.					SATURDAY, FEB. 1.																								
0	15 23 51.91	2.2218	S. 22 38 32.1	9.914	0	17 13 29.37	2.3265	S. 27 58 5.4	3.205																				
1	15 26 5.31	2.2248	22 48 23.2	9.788	PHASES OF THE MOON.																								
2	15 28 18.89	2.2279	22 58 6.7	9.662																									
3	15 30 32.66	2.2310	23 7 42.6	9.535																									
4	15 32 46.61	2.2339	23 17 10.9	9.407																									
5	15 35 0.73	2.2368	23 26 31.5	9.278																									
6	15 37 15.03	2.2398	23 35 44.3	9.148	<table><tr><td></td><td>d</td><td>h</td><td>m</td></tr><tr><td>● New Moon . . . Jan.</td><td>6</td><td>22</td><td>28.3</td></tr><tr><td>☾ First Quarter . . .</td><td>15</td><td>4</td><td>1.6</td></tr><tr><td>○ Full Moon . . .</td><td>22</td><td>3</td><td>40.1</td></tr><tr><td>☾ Last Quarter . . .</td><td>28</td><td>19</td><td>34.0</td></tr></table>						d	h	m	● New Moon . . . Jan.	6	22	28.3	☾ First Quarter . . .	15	4	1.6	○ Full Moon . . .	22	3	40.1	☾ Last Quarter . . .	28	19	34.0
	d	h	m																										
● New Moon . . . Jan.	6	22	28.3																										
☾ First Quarter . . .	15	4	1.6																										
○ Full Moon . . .	22	3	40.1																										
☾ Last Quarter . . .	28	19	34.0																										
7	15 39 29.51	2.2428	23 44 49.3	9.018	<table><tr><td></td><td>d</td><td>h</td></tr><tr><td>☾ Apogee . . . Jan.</td><td>10</td><td>12.5</td></tr><tr><td>☾ Perigee . . .</td><td>22</td><td>23.4</td></tr></table>						d	h	☾ Apogee . . . Jan.	10	12.5	☾ Perigee . . .	22	23.4											
	d	h																											
☾ Apogee . . . Jan.	10	12.5																											
☾ Perigee . . .	22	23.4																											
8	15 41 44.17	2.2457	23 53 46.5	8.888																									
9	15 43 59.00	2.2487	24 2 35.9	8.757																									
10	15 46 14.01	2.2516	24 11 17.3	8.624																									
11	15 48 29.19	2.2545	24 19 50.8	8.492																									
12	15 50 44.55	2.2573	24 28 16.3	8.357																									
13	15 53 0.07	2.2602	24 36 33.7	8.223																									
14	15 55 15.77	2.2630	24 44 43.1	8.089																									
15	15 57 31.63	2.2657	24 52 44.4	7.953																									
16	15 59 47.65	2.2684	25 0 37.5	7.817																									
17	16 2 3.84	2.2711	25 8 22.5	7.681																									
18	16 4 20.18	2.2737	25 15 59.2	7.543																									
19	16 6 36.69	2.2764	25 23 27.6	7.405																									
20	16 8 53.35	2.2789	25 30 47.8	7.267																									
21	16 11 10.16	2.2814	25 37 59.6	7.127																									
22	16 13 27.12	2.2838	25 45 3.1	6.988																									
23	16 15 44.22	2.2862	25 51 58.2	6.847																									
24	16 18 1.47	2.2887	S. 25 58 44.8	6.707																									

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Sat.	1	20 58 6.64	10.202	S. 17 11 11.3	+42.49	16 15.63	68.28	13 43.94	0.346
SUN.	2	21 2 11.10	10.169	16 54 2.5	43.24	16 15.48	68.16	13 51.82	0.312
Mon.	3	21 6 14.74	10.135	16 36 35.8	43.98	16 15.32	68.04	13 58.89	0.278
Tues.	4	21 10 17.57	10.102	16 18 51.7	+44.69	16 15.16	67.93	14 5.15	0.244
Wed.	5	21 14 19.59	10.068	16 0 50.6	45.39	16 15.00	67.81	14 10.60	0.210
Thur.	6	21 18 20.80	10.034	15 42 33.0	46.07	16 14.84	67.70	14 15.23	0.176
Fri.	7	21 22 21.19	10.000	15 23 59.3	+46.73	16 14.67	67.58	14 19.06	0.143
Sat.	8	21 26 20.77	9.966	15 5 9.9	47.38	16 14.50	67.47	14 22.08	0.109
SUN.	9	21 30 19.55	9.932	14 46 5.3	48.00	16 14.32	67.35	14 24.29	0.076
Mon.	10	21 34 17.52	9.899	14 26 45.8	+48.60	16 14.14	67.24	14 25.70	0.043
Tues.	11	21 38 14.70	9.866	14 7 12.0	49.19	16 13.97	67.13	14 26.32	0.010
Wed.	12	21 42 11.09	9.834	13 47 24.3	49.76	16 13.79	67.02	14 26.15	0.023
Thur.	13	21 46 6.70	9.801	13 27 23.1	+50.31	16 13.60	66.91	14 25.21	0.055
Fri.	14	21 50 1.54	9.769	13 7 8.8	50.84	16 13.41	66.81	14 23.50	0.088
Sat.	15	21 53 55.61	9.737	12 46 41.9	51.36	16 13.22	66.71	14 21.02	0.120
SUN.	16	21 57 48.92	9.706	12 26 2.9	+51.86	16 13.02	66.61	14 17.79	0.150
Mon.	17	22 1 41.50	9.676	12 5 12.1	52.35	16 12.82	66.51	14 13.82	0.180
Tues.	18	22 5 33.37	9.646	11 44 9.9	52.82	16 12.61	66.41	14 9.15	0.209
Wed.	19	22 9 24.53	9.617	11 22 56.7	+53.27	16 12.40	66.31	14 3.78	0.238
Thur.	20	22 13 14.99	9.589	11 1 32.8	53.71	16 12.19	66.21	13 57.72	0.265
Fri.	21	22 17 4.79	9.562	10 39 58.7	54.12	16 11.98	66.11	13 50.98	0.292
Sat.	22	22 20 53.95	9.535	10 18 14.8	+54.52	16 11.76	66.02	13 43.59	0.319
SUN.	23	22 24 42.48	9.510	9 56 21.4	54.91	16 11.53	65.93	13 35.58	0.346
Mon.	24	22 28 30.40	9.485	9 34 18.9	55.29	16 11.30	65.84	13 26.97	0.371
Tues.	25	22 32 17.73	9.461	9 12 7.7	+55.65	16 11.06	65.75	13 17.78	0.395
Wed.	26	22 36 4.49	9.437	8 49 48.1	55.98	16 10.82	65.67	13 8.02	0.418
Thur.	27	22 39 50.70	9.415	8 27 20.6	56.30	16 10.57	65.59	12 57.70	0.441
Fri.	28	22 43 36.37	9.393	8 4 45.5	56.61	16 10.33	65.51	12 46.84	0.463
Sat.	29	22 47 21.54	9.372	S. 7 42 3.2	+56.90	16 10.08	65.43	12 35.48	0.484

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^h.18 from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

No.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun,
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
N.	1	20 58 4.30	10.202	S. 17 11 20.9	+42.48	13 43.86	0.346	20 44 20.43
	2	21 2 8.74	10.168	16 54 12.3	43.23	13 51.75	0.312	20 48 16.99
	3	21 6 12.38	10.134	16 36 45.9	43.97	13 58.83	0.278	20 52 13.55
S.	4	21 10 15.20	10.101	16 19 2.1	+44.68	14 5.10	0.244	20 56 10.10
	5	21 14 17.21	10.067	16 1 1.3	45.38	14 10.55	0.210	21 0 6.66
	6	21 18 18.41	10.033	15 42 43.9	46.06	14 15.19	0.176	21 4 3.22
N.	7	21 22 18.80	9.999	15 24 10.4	+46.72	14 19.03	0.143	21 7 59.77
	8	21 26 18.38	9.966	15 5 21.2	47.37	14 22.06	0.109	21 11 56.33
	9	21 30 17.16	9.932	14 46 16.8	47.99	14 24.28	0.076	21 15 52.88
S.	10	21 34 15.14	9.899	14 26 57.5	+48.60	14 25.70	0.043	21 19 49.44
	11	21 38 12.32	9.866	14 7 23.9	49.19	14 26.32	0.010	21 23 46.00
	12	21 42 8.71	9.834	13 47 36.3	49.76	14 26.16	0.023	21 27 42.55
N.	13	21 46 4.33	9.801	13 27 35.2	+50.32	14 25.23	0.055	21 31 39.11
	14	21 49 59.18	9.769	13 7 21.1	50.85	14 23.52	0.087	21 35 35.66
	15	21 53 53.27	9.738	12 46 54.3	51.37	14 21.05	0.119	21 39 32.22
S.	16	21 57 46.61	9.707	12 26 15.3	+51.87	14 17.83	0.149	21 43 28.77
	17	22 1 39.21	9.677	12 5 24.5	52.35	14 13.88	0.179	21 47 25.33
	18	22 5 31.09	9.647	11 44 22.3	52.82	14 9.21	0.209	21 51 21.88
N.	19	22 9 22.27	9.618	11 23 9.1	+53.27	14 3.83	0.238	21 55 18.44
	20	22 13 12.76	9.590	11 1 45.3	53.71	13 57.76	0.265	21 59 14.99
	21	22 17 2.58	9.563	10 40 11.2	54.12	13 51.03	0.292	22 3 11.55
S.	22	22 20 51.76	9.536	10 18 27.3	+54.52	13 43.66	0.319	22 7 8.10
	23	22 24 40.32	9.511	9 56 33.9	54.91	13 35.66	0.346	22 11 4.66
	24	22 28 28.27	9.486	9 34 31.3	55.29	13 27.05	0.371	22 15 1.21
N.	25	22 32 15.63	9.462	9 12 20.0	+55.65	13 17.86	0.395	22 18 57.77
	26	22 36 2.42	9.438	8 50 0.4	55.99	13 8.10	0.418	22 22 54.32
	27	22 39 48.66	9.416	8 27 32.8	56.31	12 57.79	0.441	22 26 50.88
S.	28	22 43 34.37	9.394	8 4 57.6	56.62	12 46.94	0.463	22 30 47.43
	29	22 47 19.57	9.373	S. 7 42 15.2	+56.91	12 35.58	0.484	22 34 43.98

RE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,
+9^s.8565.
(Table III.)

AT GREENWICH MEAN NOON.													
Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.			
		True Longitude.			Diff. for 1 Hour.	Latitude.							
		λ	λ'										
		$^{\circ}$	$'$	$''$	$'$	$''$	$''$	$''$			h	m	s
1	32	312	3	31.0	3	27.1	152.24	−0.58	9.993 6655	+28.0	3	15	7.51
2	33	313	4	24.3	4	20.3	152.20	0.61	9.993 7335	28.7	3	11	11.60
3	34	314	5	16.7	5	12.5	152.16	0.61	9.993 8030	29.3	3	7	15.69
4	35	315	6	8.1	6	3.7	152.12	−0.57	9.993 8739	+29.8	3	3	19.78
5	36	316	6	58.4	6	53.8	152.07	0.51	9.993 9462	30.3	2	59	23.87
6	37	317	7	47.5	7	42.8	152.02	0.43	9.994 0198	30.9	2	55	27.96
7	38	318	8	35.3	8	30.5	151.97	−0.33	9.994 0946	+31.4	2	51	32.05
8	39	319	9	21.8	9	16.8	151.91	0.22	9.994 1707	32.0	2	47	36.14
9	40	320	10	6.8	10	1.7	151.85	−0.10	9.994 2480	32.5	2	43	40.23
10	41	321	10	50.4	10	45.1	151.78	+0.03	9.994 3267	+33.1	2	39	44.32
11	42	322	11	32.4	11	27.0	151.72	0.15	9.994 4067	33.6	2	35	48.41
12	43	323	12	12.8	12	7.3	151.65	0.27	9.994 4880	34.2	2	31	52.50
13	44	324	12	51.5	12	45.8	151.58	+0.37	9.994 5708	+34.8	2	27	56.59
14	45	325	13	28.5	13	22.6	151.50	0.45	9.994 6551	35.5	2	24	0.68
15	46	326	14	3.7	13	57.7	151.43	0.51	9.994 7410	36.2	2	20	4.77
16	47	327	14	37.1	14	31.0	151.35	+0.53	9.994 8287	+36.9	2	16	8.86
17	48	328	15	8.7	15	2.4	151.28	0.53	9.994 9182	37.6	2	12	12.95
18	49	329	15	38.5	15	32.1	151.21	0.50	9.995 0096	38.4	2	8	17.04
19	50	330	16	6.5	16	0.0	151.13	+0.43	9.995 1030	+39.2	2	4	21.13
20	51	331	16	32.8	16	26.2	151.06	0.33	9.995 1985	40.1	2	0	25.22
21	52	332	16	57.4	16	50.7	150.99	0.21	9.995 2962	41.0	1	56	29.32
22	53	333	17	20.4	17	13.6	150.93	+0.08	9.995 3959	+41.9	1	52	33.41
23	54	334	17	41.9	17	34.9	150.87	−0.06	9.995 4976	42.7	1	48	37.50
24	55	335	18	1.9	17	54.8	150.81	0.19	9.995 6012	43.5	1	44	41.59
25	56	336	18	20.4	18	13.2	150.75	−0.32	9.995 7065	+44.2	1	40	45.68
26	57	337	18	37.5	18	30.1	150.68	0.43	9.995 8134	44.8	1	36	49.77
27	58	338	18	53.1	18	45.6	150.62	0.51	9.995 9217	45.4	1	32	53.86
28	59	339	19	7.2	18	59.5	150.56	0.58	9.996 0313	45.9	1	28	57.96
29	60	340	19	19.8	19	12.0	150.50	−0.60	9.996 1419	+46.3	1	25	2.05
NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.												Diff. for 1 Hour, −9 ^s .8296. (Table II.)	

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 7.2	15 3.1	55 23.73	−1.317	55 8.73	−1.184	21 15.1	2.24	25.1
2	14 59.5	14 56.2	54 55.29	1.055	54 43.36	0.933	22 8.1	2.17	26.1
3	14 53.4	14 50.9	54 32.88	0.814	54 23.79	0.701	22 59.0	2.06	27.1
4	14 48.8	14 47.0	54 16.03	−0.592	54 9.56	−0.488	23 46.9	1.93	28.1
5	14 45.6	14 44.5	54 4.33	0.384	54 0.34	0.280	0	.	29.1
6	14 43.8	14 43.4	53 57.61	−0.175	53 56.14	−0.071	0 31.7	1.81	0.3
7	14 43.3	14 43.6	53 55.94	+0.039	53 57.10	+0.155	1 13.8	1.71	1.3
8	14 44.3	14 45.4	53 59.69	0.278	54 3.80	0.407	1 53.9	1.64	2.3
9	14 47.0	14 49.0	54 9.50	0.545	54 16.90	0.691	2 33.0	1.62	3.3
10	14 51.5	14 54.6	54 26.10	+0.844	54 37.19	+1.005	3 12.1	1.64	4.3
11	14 58.1	15 2.2	54 50.24	1.172	55 5.33	1.344	3 52.3	1.72	5.3
12	15 6.9	15 12.2	55 22.48	1.515	55 41.70	1.686	4 34.9	1.84	6.3
13	15 17.9	15 24.2	56 2.92	+1.849	56 26.04	+2.002	5 21.0	2.01	7.3
14	15 31.0	15 38.2	56 50.93	2.142	57 17.36	2.257	6 11.9	2.23	8.3
15	15 45.7	15 53.5	57 44.99	2.342	58 13.41	2.390	7 8.0	2.44	9.3
16	16 1.3	16 9.1	58 42.19	+2.399	59 10.76	+2.354	8 8.9	2.61	10.3
17	16 16.6	16 23.8	59 38.45	2.253	60 4.55	2.089	9 12.5	2.66	11.3
18	16 30.2	16 35.9	60 28.31	1.864	60 49.02	1.579	10 16.0	2.60	12.3
19	16 40.5	16 43.9	61 5.97	+1.239	61 18.55	+0.853	11 16.9	2.46	13.3
20	16 46.0	16 46.8	61 26.32	+0.437	61 28.96	+0.002	12 13.9	2.30	14.3
21	16 46.1	16 43.9	61 26.35	−0.436	61 18.58	−0.856	13 7.4	2.17	15.3
22	16 40.5	16 35.8	61 5.95	−1.243	60 48.93	−1.588	13 58.4	2.09	16.3
23	16 30.2	16 23.6	60 28.07	1.879	60 4.08	2.109	14 48.2	2.07	17.3
24	16 16.4	16 8.8	59 37.71	2.276	59 9.71	2.382	15 38.2	2.10	18.3
25	16 0.9	15 53.0	58 40.77	−2.432	58 11.57	−2.427	16 29.2	2.16	19.3
26	15 45.1	15 37.5	57 42.71	2.377	57 14.67	2.290	17 21.8	2.22	20.3
27	15 30.2	15 23.3	56 47.86	2.173	56 22.61	2.031	18 15.8	2.27	21.3
28	15 16.9	15 11.0	55 59.17	−1.872	55 37.71	−1.700	19 10.4	2.27	22.3
29	15 5.7	15 1.1	55 18.37	1.522	55 1.18	1.342	20 4.1	2.20	23.3
30	14 57.0	14 53.5	54 46.16	1.162	54 33.27	0.986	20 55.7	2.09	24.3
31	14 50.5	14 48.2	54 22.47	0.816	54 13.67	0.652	21 44.4	1.97	25.3
32	14 46.3	14 44.9	54 6.78	−0.498	54 1.68	−0.353	22 30.0	1.84	26.3

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 13.					SATURDAY 15.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	2 42 22.08	2.0755	N.19 17 51.0	11.622	0	4 31 2.39	2.4597	N.26 41 46.8	6.271
1	2 44 26.82	2.0827	19 29 26.0	11.546	1	4 33 30.21	2.4676	26 47 58.5	6.119
2	2 46 32.00	2.0900	19 40 56.4	11.468	2	4 35 58.50	2.4755	26 54 1.1	5.967
3	2 48 37.62	2.0972	19 52 22.2	11.389	3	4 38 27.27	2.4833	26 59 54.5	5.812
4	2 50 43.67	2.1045	20 3 43.2	11.309	4	4 40 56.50	2.4910	27 5 38.6	5.657
5	2 52 50.16	2.1120	20 14 59.3	11.227	5	4 43 26.19	2.4987	27 11 13.3	5.499
6	2 54 57.10	2.1195	20 26 10.5	11.145	6	4 45 56.34	2.5062	27 16 38.5	5.339
7	2 57 4.50	2.1270	20 37 16.7	11.060	7	4 48 26.94	2.5137	27 21 54.0	5.178
8	2 59 12.35	2.1346	20 48 17.7	10.974	8	4 50 57.98	2.5211	27 26 59.9	5.017
9	3 1 20.65	2.1422	20 59 13.6	10.887	9	4 53 29.47	2.5285	27 31 56.0	4.853
10	3 3 29.41	2.1498	21 10 4.2	10.799	10	4 56 1.40	2.5357	27 36 42.2	4.687
11	3 5 38.63	2.1576	21 20 49.5	10.709	11	4 58 33.76	2.5429	27 41 18.4	4.519
12	3 7 48.32	2.1654	21 31 29.3	10.617	12	5 1 6.55	2.5500	27 45 44.5	4.351
13	3 9 58.48	2.1732	21 42 3.6	10.524	13	5 3 39.76	2.5570	27 50 0.5	4.181
14	3 12 9.11	2.1812	21 52 32.2	10.430	14	5 6 13.39	2.5638	27 54 6.2	4.009
15	3 14 20.22	2.1891	22 2 55.1	10.333	15	5 8 47.42	2.5706	27 58 1.6	3.837
16	3 16 31.80	2.1970	22 13 12.2	10.236	16	5 11 21.86	2.5772	28 1 46.6	3.662
17	3 18 43.86	2.2050	22 23 23.4	10.137	17	5 13 56.70	2.5838	28 5 21.0	3.486
18	3 20 56.40	2.2131	22 33 28.6	10.037	18	5 16 31.92	2.5902	28 8 44.9	3.309
19	3 23 9.43	2.2212	22 43 27.8	9.935	19	5 19 7.52	2.5965	28 11 58.1	3.130
20	3 25 22.94	2.2293	22 53 20.8	9.831	20	5 21 43.50	2.6027	28 15 0.5	2.949
21	3 27 36.94	2.2374	23 3 7.5	9.725	21	5 24 19.85	2.6087	28 17 52.0	2.767
22	3 29 51.43	2.2456	23 12 47.8	9.618	22	5 26 56.55	2.6147	28 20 32.6	2.585
23	3 32 6.41	2.2538	N.23 22 21.7	9.511	23	5 29 33.60	2.6204	N.28 23 2.2	2.402
FRIDAY 14.					SUNDAY 16.				
0	3 34 21.89	2.2621	N.23 31 49.1	9.401	0	5 32 11.00	2.6261	N.28 25 20.8	2.217
1	3 36 37.86	2.2703	23 41 9.8	9.289	1	5 34 48.73	2.6316	28 27 28.2	2.050
2	3 38 54.32	2.2785	23 50 23.8	9.176	2	5 37 26.79	2.6370	28 29 24.4	1.842
3	3 41 11.28	2.2868	23 59 30.9	9.061	3	5 40 5.17	2.6422	28 31 9.2	1.652
4	3 43 28.74	2.2952	24 8 31.1	8.945	4	5 42 43.85	2.6472	28 32 42.7	1.463
5	3 45 46.70	2.3035	24 17 24.3	8.827	5	5 45 22.83	2.6521	28 34 4.8	1.272
6	3 48 5.16	2.3118	24 26 10.3	8.707	6	5 48 2.10	2.6568	28 35 15.4	1.079
7	3 50 24.12	2.3201	24 34 49.1	8.586	7	5 50 41.65	2.6614	28 36 14.3	0.886
8	3 52 43.57	2.3284	24 43 20.6	8.462	8	5 53 21.47	2.6658	28 37 1.7	0.692
9	3 55 3.52	2.3368	24 51 44.6	8.337	9	5 56 1.55	2.6701	28 37 37.4	0.497
10	3 57 23.98	2.3452	25 0 1.1	8.212	10	5 58 41.88	2.6742	28 38 1.3	0.301
11	3 59 44.94	2.3534	25 8 10.0	8.084	11	6 1 22.46	2.6782	28 38 13.5	+0.104
12	4 2 6.39	2.3617	25 16 11.2	7.954	12	6 4 3.26	2.6818	28 38 13.8	-0.094
13	4 4 28.34	2.3700	25 24 4.5	7.822	13	6 6 44.28	2.6854	28 38 2.2	0.292
14	4 6 50.79	2.3783	25 31 49.9	7.690	14	6 9 25.51	2.6888	28 37 38.7	0.492
15	4 9 13.74	2.3866	25 39 27.3	7.556	15	6 12 6.94	2.6921	28 37 3.2	0.692
16	4 11 37.18	2.3948	25 46 56.6	7.419	16	6 14 48.56	2.6952	28 36 15.6	0.893
17	4 14 1.12	2.4032	25 54 17.7	7.282	17	6 17 30.36	2.6980	28 35 16.0	1.094
18	4 16 25.56	2.4113	26 1 30.4	7.142	18	6 20 12.32	2.7007	28 34 4.3	1.297
19	4 18 50.48	2.4194	26 8 34.7	7.001	19	6 22 54.44	2.7032	28 32 40.4	1.500
20	4 21 15.89	2.4276	26 15 30.5	6.859	20	6 25 36.70	2.7054	28 31 4.3	1.703
21	4 23 41.79	2.4357	26 22 17.8	6.715	21	6 28 19.09	2.7076	28 29 16.0	1.907
22	4 26 8.18	2.4438	26 28 56.3	6.568	22	6 31 1.61	2.7096	28 27 15.5	2.111
23	4 28 35.05	2.4518	26 35 26.0	6.421	23	6 33 44.24	2.7112	28 25 2.7	2.315
24	4 31 2.39	2.4597	N.26 41 46.8	6.271	24	6 36 26.96	2.7128	N.28 22 37.7	2.520

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 21.					SUNDAY 23.				
0	10 42 44.48	2.3155	N. 10 33 45.6	17.243	0	12 29 39.39	2.1715	S. 3 41 48.7	17.616
1	10 45 3.26	2.3106	10 16 29.2	17.302	1	12 31 49.65	2.1706	3 59 24.5	17.576
2	10 47 21.75	2.3057	9 59 9.4	17.357	2	12 33 59.86	2.1697	4 16 57.8	17.534
3	10 49 39.95	2.3010	9 41 46.4	17.410	3	12 36 10.02	2.1690	4 34 28.6	17.491
4	10 51 57.87	2.2963	9 24 20.2	17.462	4	12 38 20.14	2.1683	4 51 56.7	17.446
5	10 54 15.51	2.2917	9 6 51.0	17.511	5	12 40 30.22	2.1677	5 9 22.1	17.399
6	10 56 32.87	2.2872	8 49 18.9	17.557	6	12 42 40.27	2.1672	5 26 44.6	17.350
7	10 58 49.97	2.2827	8 31 44.1	17.601	7	12 44 50.29	2.1668	5 44 4.1	17.300
8	11 1 6.80	2.2783	8 14 6.7	17.643	8	12 47 0.28	2.1664	6 1 20.6	17.249
9	11 3 23.37	2.2740	7 56 26.9	17.684	9	12 49 10.26	2.1662	6 18 34.0	17.196
10	11 5 39.68	2.2698	7 38 44.7	17.722	10	12 51 20.22	2.1660	6 35 44.1	17.140
11	11 7 55.75	2.2657	7 21 0.3	17.757	11	12 53 30.18	2.1659	6 52 50.8	17.083
12	11 10 11.57	2.2617	7 3 13.9	17.790	12	12 55 40.13	2.1658	7 9 54.1	17.026
13	11 12 27.15	2.2577	6 45 25.5	17.822	13	12 57 50.08	2.1658	7 26 53.9	16.966
14	11 14 42.49	2.2537	6 27 35.3	17.850	14	13 0 0.03	2.1660	7 43 50.0	16.904
15	11 16 57.60	2.2499	6 9 43.5	17.877	15	13 2 10.00	2.1662	8 0 42.4	16.842
16	11 19 12.48	2.2462	5 51 50.1	17.902	16	13 4 19.98	2.1664	8 17 31.0	16.777
17	11 21 27.14	2.2426	5 33 55.3	17.924	17	13 6 29.97	2.1667	8 34 15.7	16.712
18	11 23 41.59	2.2390	5 15 59.2	17.945	18	13 8 39.99	2.1672	8 50 56.4	16.644
19	11 25 55.82	2.2354	4 58 1.9	17.963	19	13 10 50.03	2.1676	9 7 33.0	16.575
20	11 28 9.84	2.2321	4 40 3.6	17.978	20	13 13 0.10	2.1682	9 24 5.4	16.504
21	11 30 23.67	2.2288	4 22 4.5	17.992	21	13 15 10.21	2.1688	9 40 33.5	16.432
22	11 32 37.29	2.2255	4 4 4.5	18.005	22	13 17 20.36	2.1695	9 56 57.3	16.359
23	11 34 50.73	2.2224	N. 3 46 3.9	18.014	23	13 19 30.55	2.1702	S. 10 13 16.6	16.284
SATURDAY 22.					MONDAY 24.				
0	11 37 3.98	2.2193	N. 3 28 2.8	18.022	0	13 21 40.79	2.1711	S. 10 29 31.4	16.208
1	11 39 17.05	2.2163	3 10 1.3	18.027	1	13 23 51.08	2.1719	10 45 41.6	16.131
2	11 41 29.94	2.2134	2 51 59.5	18.031	2	13 26 1.42	2.1729	11 1 47.1	16.052
3	11 43 42.66	2.2106	2 33 57.6	18.033	3	13 28 11.83	2.1740	11 17 47.8	15.971
4	11 45 55.21	2.2078	2 15 55.6	18.033	4	13 30 22.30	2.1750	11 33 43.6	15.888
5	11 48 7.60	2.2052	1 57 53.7	18.030	5	13 32 32.83	2.1762	11 49 34.4	15.805
6	11 50 19.84	2.2027	1 39 52.0	18.025	6	13 34 43.44	2.1774	12 5 20.2	15.722
7	11 52 31.93	2.2002	1 21 50.7	18.018	7	13 36 54.12	2.1787	12 21 1.0	15.636
8	11 54 43.87	2.1978	1 3 49.8	18.009	8	13 39 4.88	2.1800	12 36 36.5	15.547
9	11 56 55.67	2.1956	0 45 49.6	17.998	9	13 41 15.72	2.1813	12 52 6.7	15.459
10	11 59 7.34	2.1933	0 27 50.0	17.987	10	13 43 26.64	2.1827	13 7 31.6	15.370
11	12 1 18.87	2.1912	N. 0 9 51.2	17.972	11	13 45 37.65	2.1843	13 22 51.1	15.279
12	12 3 30.28	2.1892	S. 0 8 6.7	17.956	12	13 47 48.76	2.1859	13 38 5.1	15.187
13	12 5 41.57	2.1872	0 26 3.5	17.937	13	13 49 59.96	2.1875	13 53 13.5	15.092
14	12 7 52.75	2.1854	0 43 59.2	17.918	14	13 52 11.26	2.1892	14 8 16.2	14.997
15	12 10 3.82	2.1837	1 1 53.7	17.897	15	13 54 22.66	2.1909	14 23 13.2	14.902
16	12 12 14.79	2.1820	1 19 46.8	17.872	16	13 56 34.17	2.1927	14 38 4.4	14.805
17	12 14 25.66	2.1803	1 37 38.3	17.846	17	13 58 45.78	2.1944	14 52 49.8	14.707
18	12 16 36.43	2.1788	1 55 28.3	17.819	18	14 0 57.50	2.1963	15 7 29.2	14.606
19	12 18 47.12	2.1774	2 13 16.6	17.790	19	14 3 9.34	2.1982	15 22 2.5	14.505
20	12 20 57.72	2.1760	2 31 3.1	17.759	20	14 5 21.29	2.2002	15 36 29.8	14.403
21	12 23 8.24	2.1747	2 48 47.7	17.726	21	14 7 33.36	2.2022	15 50 50.9	14.300
22	12 25 18.69	2.1736	3 6 30.2	17.691	22	14 9 45.56	2.2043	16 5 5.8	14.195
23	12 27 29.07	2.1725	3 24 10.6	17.654	23	14 11 57.88	2.2063	16 19 14.3	14.089
24	12 29 39.39	2.1715	S. 3 41 48.7	17.616	24	14 14 10.32	2.2084	S. 16 33 16.5	13.983

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 25.					THURSDAY 27.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	14 14 10.32	2.2084	S. 16 33 16.5	13.983	0	16 2 58.66	2.3240	S. 25 22 48.5	7.763
1	14 16 22.89	2.2106	16 47 12.3	13.875	1	16 5 18.16	2.3259	25 30 29.9	7.616
2	14 18 35.59	2.2128	17 1 1.5	13.766	2	16 7 37.77	2.3278	25 38 2.4	7.468
3	14 20 48.43	2.2151	17 14 44.2	13.656	3	16 9 57.50	2.3297	25 45 26.1	7.321
4	14 23 1.40	2.2173	17 28 20.2	13.544	4	16 12 17.34	2.3315	25 52 40.9	7.172
5	14 25 14.51	2.2196	17 41 49.5	13.432	5	16 14 37.28	2.3332	25 59 46.7	7.022
6	14 27 27.75	2.2219	17 55 12.0	13.319	6	16 16 57.33	2.3350	26 6 43.6	6.873
7	14 29 41.14	2.2243	18 8 27.8	13.205	7	16 19 17.48	2.3367	26 13 31.5	6.724
8	14 31 54.67	2.2267	18 21 36.6	13.089	8	16 21 37.73	2.3382	26 20 10.5	6.574
9	14 34 8.34	2.2291	18 34 38.5	12.973	9	16 23 58.07	2.3397	26 26 40.4	6.423
10	14 36 22.16	2.2315	18 47 33.4	12.856	10	16 26 18.50	2.3412	26 33 1.3	6.272
11	14 38 36.12	2.2339	19 0 21.2	12.737	11	16 28 39.01	2.3426	26 39 13.1	6.121
12	14 40 50.23	2.2364	19 13 1.8	12.617	12	16 30 59.61	2.3439	26 45 15.8	5.969
13	14 43 4.49	2.2389	19 25 35.2	12.497	13	16 33 20.28	2.3452	26 51 9.4	5.817
14	14 45 18.90	2.2414	19 38 1.4	12.376	14	16 35 41.03	2.3464	26 56 53.9	5.665
15	14 47 33.46	2.2439	19 50 20.3	12.253	15	16 38 1.85	2.3475	27 2 29.2	5.512
16	14 49 48.17	2.2464	20 2 31.8	12.130	16	16 40 22.73	2.3485	27 7 55.4	5.361
17	14 52 3.03	2.2490	20 14 35.9	12.006	17	16 42 43.67	2.3495	27 13 12.5	5.208
18	14 54 18.05	2.2516	20 26 32.5	11.881	18	16 45 4.67	2.3504	27 18 20.4	5.054
19	14 56 33.22	2.2541	20 38 21.6	11.755	19	16 47 25.72	2.3513	27 23 19.0	4.901
20	14 58 48.54	2.2567	20 50 3.1	11.628	20	16 49 46.82	2.3521	27 28 8.5	4.748
21	15 1 4.02	2.2592	21 1 37.0	11.500	21	16 52 7.97	2.3527	27 32 48.8	4.594
22	15 3 19.65	2.2618	21 13 3.1	11.371	22	16 54 29.15	2.3533	27 37 19.8	4.440
23	15 5 35.44	2.2645	S. 21 24 21.5	11.242	23	16 56 50.37	2.3539	S. 27 41 41.6	4.287
WEDNESDAY 26.					FRIDAY 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	15 7 51.39	2.2671	S. 21 35 32.1	11.111	0	16 59 11.62	2.3543	S. 27 45 54.2	4.132
1	15 10 7.49	2.2696	21 46 34.8	10.980	1	17 1 32.89	2.3547	27 49 57.5	3.978
2	15 12 23.74	2.2722	21 57 29.7	10.848	2	17 3 54.18	2.3549	27 53 51.6	3.824
3	15 14 40.15	2.2747	22 8 16.6	10.716	3	17 6 15.48	2.3552	27 57 36.4	3.670
4	15 16 56.71	2.2773	22 18 55.6	10.582	4	17 8 36.80	2.3553	28 1 12.0	3.516
5	15 19 13.43	2.2799	22 29 26.5	10.447	5	17 10 58.12	2.3553	28 4 38.3	3.361
6	15 21 30.30	2.2824	22 39 49.3	10.312	6	17 13 19.44	2.3552	28 7 55.3	3.207
7	15 23 47.32	2.2849	22 50 3.9	10.176	7	17 15 40.75	2.3551	28 11 3.1	3.052
8	15 26 4.49	2.2875	23 0 10.4	10.040	8	17 18 2.05	2.3549	28 14 1.6	2.898
9	15 28 21.82	2.2900	23 10 8.7	9.902	9	17 20 23.34	2.3546	28 16 50.9	2.744
10	15 30 39.29	2.2924	23 19 58.7	9.764	10	17 22 44.60	2.3542	28 19 30.9	2.590
11	15 32 56.91	2.2949	23 29 40.4	9.625	11	17 25 5.84	2.3537	28 22 1.7	2.437
12	15 35 14.68	2.2973	23 39 13.7	9.486	12	17 27 27.05	2.3532	28 24 23.3	2.282
13	15 37 32.59	2.2997	23 48 38.7	9.346	13	17 29 48.22	2.3525	28 26 35.6	2.128
14	15 39 50.64	2.3021	23 57 55.2	9.205	14	17 32 9.35	2.3517	28 28 38.7	1.974
15	15 42 8.84	2.3045	24 7 3.3	9.063	15	17 34 30.43	2.3508	28 30 32.5	1.820
16	15 44 27.18	2.3067	24 16 2.8	8.921	16	17 36 51.45	2.3499	28 32 17.1	1.667
17	15 46 45.65	2.3090	24 24 53.8	8.778	17	17 39 12.42	2.3489	28 33 52.6	1.514
18	15 49 4.26	2.3113	24 33 36.2	8.635	18	17 41 33.32	2.3477	28 35 18.8	1.361
19	15 51 23.01	2.3136	24 42 10.0	8.491	19	17 43 54.15	2.3466	28 36 35.9	1.208
20	15 53 41.89	2.3157	24 50 35.1	8.347	20	17 46 14.91	2.3453	28 37 43.8	1.056
21	15 56 0.89	2.3177	24 58 51.6	8.202	21	17 48 35.59	2.3440	28 38 42.6	0.903
22	15 58 20.02	2.3199	25 6 59.3	8.056	22	17 50 56.19	2.3425	28 39 32.2	0.751
23	16 0 39.28	2.3220	25 14 58.3	7.910	23	17 53 16.69	2.3409	28 40 12.7	0.600
24	16 2 58.66	2.3240	S. 25 22 48.5	7.763	24	17 55 37.10	2.3392	S. 28 40 44.2	0.448

PHASES OF THE MOON.

			d	h	m
●	New Moon	Feb.	5	17	21.9
)	First Quarter		13	20	33.9
○	Full Moon		20	14	3.3
(	Last Quarter		27	9	15.4
			d	h	
(	Apogee	Feb.	6	19.8	
(	Perigee		20	12.1	

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Sat.	1	22 47 21.54	9.372	S. 7 42 3.2	+56.90	16 10.08	65.43	12 35.48	0.484
SUN.	2	22 51 6.19	9.350	7 19 14.2	57.17	16 9.84	65.36	12 23.62	0.504
Mon.	3	22 54 50.36	9.329	6 56 18.9	57.43	16 9.59	65.29	12 11.27	0.524
Tues.	4	22 58 34.07	9.311	6 33 17.6	+57.67	16 9.34	65.22	11 58.46	0.543
Wed.	5	23 2 17.33	9.293	6 10 10.7	57.89	16 9.08	65.15	11 45.20	0.561
Thur.	6	23 6 0.14	9.276	5 46 58.7	58.10	16 8.83	65.09	11 31.50	0.579
Fri.	7	23 9 42.54	9.259	5 23 42.0	+58.29	16 8.57	65.03	11 17.39	0.596
Sat.	8	23 13 24.55	9.242	5 0 21.0	58.46	16 8.31	64.97	11 2.87	0.613
SUN.	9	23 17 6.17	9.226	4 36 56.0	58.61	16 8.05	64.92	10 47.97	0.628
Mon.	10	23 20 47.42	9.211	4 13 27.5	+58.75	16 7.80	64.87	10 32.70	0.643
Tues.	11	23 24 28.31	9.197	3 49 55.9	58.87	16 7.54	64.82	10 17.09	0.657
Wed.	12	23 28 8.87	9.184	3 26 21.7	58.98	16 7.28	64.77	10 1.15	0.671
Thur.	13	23 31 49.12	9.171	3 2 45.1	+59.06	16 7.02	64.72	9 44.89	0.684
Fri.	14	23 35 29.07	9.159	2 39 6.6	59.12	16 6.76	64.68	9 28.33	0.696
Sat.	15	23 39 8.74	9.148	2 15 26.6	59.18	16 6.50	64.64	9 11.49	0.707
SUN.	16	23 42 48.15	9.138	1 51 45.5	+59.23	16 6.24	64.61	8 54.39	0.717
Mon.	17	23 46 27.33	9.128	1 28 3.7	59.25	16 5.97	64.58	8 37.06	0.726
Tues.	18	23 50 6.29	9.119	1 4 21.5	59.26	16 5.71	64.55	8 19.52	0.735
Wed.	19	23 53 45.05	9.112	0 40 39.2	+59.25	16 5.44	64.52	8 1.77	0.743
Thur.	20	23 57 23.63	9.105	S. 0 16 57.2	59.24	16 5.17	64.50	7 43.85	0.750
Fri.	21	0 1 2.07	9.100	N. 0 6 44.1	59.21	16 4.90	64.48	7 25.79	0.756
Sat.	22	0 4 40.39	9.095	0 30 24.5	+59.16	16 4.63	64.47	7 7.61	0.760
SUN.	23	0 8 18.61	9.091	0 54 3.6	59.10	16 4.35	64.46	6 49.33	0.764
Mon.	24	0 11 56.75	9.089	1 17 41.2	59.03	16 4.07	64.45	6 30.97	0.766
Tues.	25	0 15 34.84	9.087	1 41 16.9	+58.94	16 3.79	64.45	6 12.56	0.768
Wed.	26	0 19 12.92	9.086	2 4 50.3	58.84	16 3.51	64.44	5 54.13	0.768
Thur.	27	0 22 50.99	9.087	2 28 21.1	58.73	16 3.23	64.44	5 35.70	0.768
Fri.	28	0 26 29.08	9.088	2 51 49.0	+58.60	16 2.95	64.44	5 17.29	0.767
Sat.	29	0 30 7.21	9.090	3 15 13.6	58.45	16 2.66	64.44	4 58.91	0.765
SUN.	30	0 33 45.40	9.093	3 38 34.6	58.29	16 2.38	64.45	4 40.59	0.762
Mon.	31	0 37 23.66	9.096	4 1 51.7	58.12	16 2.09	64.46	4 22.35	0.758
Tues.	32	0 41 2.02	9.100	N. 4 25 4.5	+57.93	16 1.81	64.47	4 4.21	0.754

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.18 from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Sat.	1	22 47 19.57	9.373	S. 7 42 15.2	+56.91	12 35.58	0.484	22 34 43.98
SUN.	2	22 51 4.26	9.351	7 19 26.1	57.18	12 23.72	0.504	22 38 40.54
Mon.	3	22 54 48.47	9.330	6 56 30.6	57.44	12 11.38	0.524	22 42 37.09
Tues.	4	22 58 32.21	9.312	6 33 29.1	+57.68	11 58.57	0.543	22 46 33.65
Wed.	5	23 2 15.50	9.294	6 10 22.0	57.90	11 45.31	0.561	22 50 30.20
Thur.	6	23 5 58.36	9.277	5 47 9.8	58.11	11 31.61	0.579	22 54 26.75
Fri.	7	23 9 40.80	9.260	5 23 52.9	+58.30	11 17.50	0.596	22 58 23.31
Sat.	8	23 13 22.84	9.244	5 0 31.7	58.47	11 2.98	0.613	23 2 19.86
SUN.	9	23 17 4.50	9.228	4 37 6.5	58.62	10 48.08	0.628	23 6 16.42
Mon.	10	23 20 45.79	9.213	4 13 37.8	+58.76	10 32.82	0.643	23 10 12.97
Tues.	11	23 24 26.73	9.199	3 50 6.0	58.88	10 17.20	0.657	23 14 9.52
Wed.	12	23 28 7.34	9.185	3 26 31.5	58.99	10 1.26	0.671	23 18 6.08
Thur.	13	23 31 47.63	9.171	3 2 54.7	+59.07	9 45.00	0.684	23 22 2.63
Fri.	14	23 35 27.62	9.159	2 39 16.0	59.14	9 28.44	0.696	23 25 59.19
Sat.	15	23 39 7.34	9.149	2 15 35.7	59.20	9 11.60	0.707	23 29 55.74
SUN.	16	23 42 46.80	9.139	1 51 54.3	+59.24	8 54.51	0.717	23 33 52.29
Mon.	17	23 46 26.02	9.130	1 28 12.2	59.26	8 37.17	0.726	23 37 48.85
Tues.	18	23 50 5.02	9.121	1 4 29.7	59.27	8 19.62	0.735	23 41 45.40
Wed.	19	23 53 43.83	9.113	0 40 47.1	+59.26	8 1.87	0.743	23 45 41.95
Thur.	20	23 57 22.46	9.106	S. 0 17 4.8	59.25	7 43.95	0.750	23 49 38.51
Fri.	21	0 1 0.95	9.101	N. 0 6 36.8	59.22	7 25.88	0.756	23 53 35.06
Sat.	22	0 4 39.31	9.097	0 30 17.5	+59.17	7 7.69	0.760	23 57 31.62
SUN.	23	0 8 17.58	9.093	0 53 57.0	59.11	6 49.41	0.764	0 1 28.17
Mon.	24	0 11 55.77	9.091	1 17 34.9	59.04	6 31.05	0.766	0 5 24.72
Tues.	25	0 15 33.91	9.089	1 41 10.8	+58.95	6 12.64	0.768	0 9 21.28
Wed.	26	0 19 12.03	9.088	2 4 44.5	58.85	5 54.20	0.768	0 13 17.83
Thur.	27	0 22 50.15	9.089	2 28 15.6	58.74	5 35.77	0.768	0 17 14.38
Fri.	28	0 26 28.29	9.090	2 51 43.8	+58.61	5 17.35	0.767	0 21 10.94
Sat.	29	0 30 6.46	9.092	3 15 8.8	58.47	4 58.97	0.765	0 25 7.49
SUN.	30	0 33 44.69	9.095	3 38 30.2	58.31	4 40.65	0.762	0 29 4.04
Mon.	31	0 37 23.00	9.098	4 1 47.5	58.14	4 22.40	0.758	0 33 0.60
Tues.	32	0 41 1.41	9.102	N. 4 25 0.5	+57.95	4 4.25	0.754	0 36 57.15

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations increasing.

Diff. for 1 Hour.
+9°.8565.
(Table III.)

GREENWICH MEAN TIME.

THE MOON'S

SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
' "	' "	' "	"	' "	"	h m	m	d
5 5.7	15 1.1	55 18.37	-1.522	55 1.18	-1.342	20 4.1	2.20	23.3
† 57.0	14 53.5	54 46.16	1.162	54 33.27	0.986	20 55.7	2.09	24.3
† 50.5	14 48.2	54 22.47	0.816	54 13.67	0.652	21 44.4	1.97	25.3
† 46.3	14 44.9	54 6.78	-0.498	54 1.68	-0.353	22 30.0	1.84	26.3
† 44.0	14 43.5	53 58.28	-0.216	53 56.47	-0.088	23 12.8	1.73	27.3
† 43.4	14 43.7	53 56.15	+0.033	53 57.23	+0.147	23 53.4	1.66	28.3
† 44.3	14 45.3	53 59.65	+0.255	54 3.33	+0.358	6	.	29.3
† 46.6	14 48.3	54 8.25	0.460	54 14.38	0.560	0 32.8	1.63	0.5
† 50.3	14 52.6	54 21.70	0.660	54 30.22	0.762	1 12.0	1.64	1.5
† 55.3	14 58.3	54 39.98	+0.867	54 51.02	+0.975	1 51.8	1.70	2.5
5 1.7	15 5.4	55 3.36	1.084	55 17.06	1.201	2 33.5	1.80	3.5
5 9.5	15 14.0	55 32.18	1.320	55 48.74	1.439	3 18.2	1.94	4.5
5 19.0	15 24.2	56 6.72	+1.556	56 26.10	+1.673	4 6.8	2.11	5.5
29.9	15 35.9	56 46.84	1.782	57 8.84	1.882	4 59.8	2.31	6.5
42.2	15 48.7	57 31.94	1.964	57 55.89	2.023	5 57.3	2.47	7.5
55.4	16 2.1	58 20.40	+2.056	58 45.11	+2.056	6 57.8	2.55	8.5
8.8	16 15.2	59 9.57	2.016	59 33.28	1.928	7 59.2	2.54	9.5
21.3	16 26.9	59 55.64	1.789	60 16.04	1.601	8 59.2	2.45	10.5
31.8	16 35.7	60 33.86	+1.360	60 48.50	+1.071	9 56.4	2.32	11.5
38.7	16 40.5	60 59.38	+0.737	61 6.05	+0.372	10 50.6	2.20	12.5°
41.1	16 40.4	61 8.19	-0.017	61 5.60	-0.415	11 42.4	2.13	13.5
38.4	16 35.2	60 58.30	-0.801	60 46.45	-1.170	12 33.1	2.11	14.5
30.8	16 25.4	60 30.37	1.501	60 10.58	1.789	13 23.9	2.14	15.5
19.1	16 12.2	59 47.64	2.024	59 22.21	2.201	14 15.8	2.20	16.5
4.8	15 57.1	58 55.02	-2.321	58 26.72	-2.386	15 9.6	2.28	17.5
49.3	15 41.5	57 57.97	2.396	57 29.40	2.357	16 5.0	2.33	18.5
33.9	15 26.6	57 1.56	2.277	56 34.90	2.161	17 1.2	2.34	19.5
19.8	15 13.5	56 9.80	-2.017	55 46.57	-1.851	17 56.8	2.28	20.5
7.7	15 2.6	55 25.46	1.666	55 6.64	1.470	18 50.2	2.16	21.5
58.1	14 54.3	54 50.22	1.267	54 36.24	1.064	19 40.4	2.02	22.5
51.1	14 48.7	54 24.71	0.859	54 15.61	0.660	20 27.2	1.89	23.5
46.8	14 45.6	54 8.88	-0.466	54 4.42	-0.281	21 10.9	1.76	24.5

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

G

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 17.					WEDNESDAY 19.				
0	7 17 28.30	2.6165	N.27 26 11.8	5.453	0	9 19 37.81	2.4438	N.19 40 18.2	13.514
1	7 20 5.25	2.6152	27 20 38.9	5.643	1	9 22 4.30	2.4390	19 26 43.3	13.648
2	7 22 42.12	2.6138	27 14 54.6	5.832	2	9 24 30.49	2.4341	19 13 0.4	13.781
3	7 25 18.91	2.6122	27 8 59.0	6.021	3	9 26 56.39	2.4292	18 59 9.6	13.912
4	7 27 55.60	2.6106	27 2 52.1	6.209	4	9 29 22.00	2.4244	18 45 11.0	14.040
5	7 30 32.18	2.6087	26 56 33.9	6.397	5	9 31 47.32	2.4195	18 31 4.8	14.167
6	7 33 8.65	2.6068	26 50 4.4	6.584	6	9 34 12.34	2.4147	18 16 51.0	14.292
7	7 35 45.00	2.6047	26 43 23.8	6.770	7	9 36 37.08	2.4099	18 2 29.7	14.416
8	7 38 21.22	2.6025	26 36 32.0	6.957	8	9 39 1.53	2.4050	17 48 1.1	14.537
9	7 40 57.30	2.6002	26 29 29.0	7.142	9	9 41 25.68	2.4002	17 33 25.2	14.657
10	7 43 33.24	2.5977	26 22 15.0	7.326	10	9 43 49.55	2.3954	17 18 42.3	14.774
11	7 46 9.03	2.5952	26 14 49.9	7.510	11	9 46 13.13	2.3907	17 3 52.3	14.891
12	7 48 44.67	2.5926	26 7 13.8	7.693	12	9 48 36.43	2.3859	16 48 55.4	15.005
13	7 51 20.14	2.5897	25 59 26.7	7.876	13	9 50 59.44	2.3812	16 33 51.7	15.117
14	7 53 55.44	2.5868	25 51 28.7	8.057	14	9 53 22.17	2.3765	16 18 41.4	15.227
15	7 56 30.56	2.5838	25 43 19.9	8.237	15	9 55 44.62	2.3718	16 3 24.5	15.335
16	7 59 5.50	2.5807	25 35 0.2	8.417	16	9 58 6.79	2.3672	15 48 1.2	15.441
17	8 1 40.25	2.5775	25 26 29.8	8.596	17	10 0 28.68	2.3626	15 32 31.6	15.545
18	8 4 14.80	2.5742	25 17 48.7	8.773	18	10 2 50.30	2.3580	15 16 55.8	15.647
19	8 6 49.15	2.5708	25 8 57.0	8.950	19	10 5 11.64	2.3535	15 1 13.9	15.747
20	8 9 23.30	2.5673	24 59 54.7	9.126	20	10 7 32.72	2.3491	14 45 26.1	15.846
21	8 11 57.23	2.5637	24 50 41.9	9.301	21	10 9 53.53	2.3446	14 29 32.4	15.942
22	8 14 30.95	2.5601	24 41 18.6	9.475	22	10 12 14.07	2.3402	14 13 33.0	16.037
23	8 17 4.44	2.5563	N.24 31 44.9	9.647	23	10 14 34.35	2.3358	N.13 57 28.0	16.129
TUESDAY 18.					THURSDAY 20.				
0	8 19 37.70	2.5524	N.24 22 1.0	9.817	0	10 16 54.37	2.3315	N.13 41 17.5	16.220
1	8 22 10.73	2.5485	24 12 6.8	9.988	1	10 19 14.13	2.3272	13 25 1.6	16.308
2	8 24 43.52	2.5444	24 2 2.4	10.157	2	10 21 33.64	2.3231	13 8 40.5	16.394
3	8 27 16.06	2.5403	23 51 47.9	10.325	3	10 23 52.90	2.3189	12 52 14.3	16.478
4	8 29 48.36	2.5362	23 41 23.4	10.491	4	10 26 11.91	2.3148	12 35 43.1	16.560
5	8 32 20.41	2.5320	23 30 49.0	10.656	5	10 28 30.68	2.3107	12 19 7.1	16.640
6	8 34 52.20	2.5277	23 20 4.7	10.820	6	10 30 49.20	2.3067	12 2 26.3	16.719
7	8 37 23.74	2.5235	23 9 10.6	10.982	7	10 33 7.49	2.3028	11 45 40.8	16.795
8	8 39 55.02	2.5191	22 58 6.8	11.144	8	10 35 25.54	2.2989	11 28 50.9	16.868
9	8 42 26.03	2.5146	22 46 53.3	11.304	9	10 37 43.36	2.2952	11 11 56.6	16.941
10	8 44 56.77	2.5102	22 35 30.3	11.462	10	10 40 0.96	2.2914	10 54 58.0	17.010
11	8 47 27.25	2.5057	22 23 57.9	11.618	11	10 42 18.33	2.2877	10 37 55.4	17.077
12	8 49 57.45	2.5010	22 12 16.1	11.774	12	10 44 35.48	2.2841	10 20 48.7	17.144
13	8 52 27.37	2.4964	22 0 25.0	11.927	13	10 46 52.42	2.2806	10 3 38.1	17.207
14	8 54 57.02	2.4918	21 48 24.8	12.079	14	10 49 9.15	2.2771	9 46 23.8	17.269
15	8 57 26.39	2.4871	21 36 15.5	12.230	15	10 51 25.67	2.2736	9 29 5.8	17.329
16	8 59 55.47	2.4823	21 23 57.2	12.379	16	10 53 41.98	2.2702	9 11 44.3	17.386
17	9 2 24.27	2.4777	21 11 30.0	12.527	17	10 55 58.10	2.2670	8 54 19.5	17.441
18	9 4 52.79	2.4729	20 58 54.0	12.673	18	10 58 14.02	2.2637	8 36 51.4	17.494
19	9 7 21.02	2.4681	20 46 9.2	12.817	19	11 0 29.75	2.2606	8 19 20.2	17.545
20	9 9 48.96	2.4632	20 33 15.8	12.961	20	11 2 45.29	2.2575	8 1 46.0	17.594
21	9 12 16.61	2.4584	20 20 13.9	13.102	21	11 5 0.65	2.2546	7 44 8.9	17.642
22	9 14 43.97	2.4536	20 7 3.6	13.241	22	11 7 15.84	2.2517	7 26 29.0	17.687
23	9 17 11.04	2.4487	19 53 45.0	13.378	23	11 9 30.85	2.2488	7 8 46.5	17.728
24	9 19 37.81	2.4438	N.19 40 18.2	13.514	24	11 11 45.69	2.2460	N. 6 51 1.6	17.769

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 29.					MONDAY 31.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	18 35 6.20	2.3373	S. 28 29 38.0	2.113	0	20 21 47.55	2.0956	S. 24 13 43.6	8.192
1	18 37 26.32	2.3334	28 27 26.8	2.261	1	20 23 53.12	2.0901	24 5 29.0	8.295
2	18 39 46.21	2.3294	28 25 6.7	2.407	2	20 25 58.36	2.0847	23 57 8.2	8.397
3	18 42 5.85	2.3252	28 22 37.9	2.553	3	20 28 3.28	2.0792	23 48 41.3	8.499
4	18 44 25.24	2.3211	28 20 0.3	2.699	4	20 30 7.87	2.0738	23 40 8.3	8.599
5	18 46 44.38	2.3169	28 17 14.0	2.843	5	20 32 12.14	2.0684	23 31 29.4	8.698
6	18 49 3.27	2.3127	28 14 19.1	2.987	6	20 34 16.08	2.0630	23 22 44.5	8.797
7	18 51 21.90	2.3083	28 11 15.6	3.129	7	20 36 19.70	2.0577	23 13 53.8	8.894
8	18 53 40.27	2.3038	28 8 3.6	3.271	8	20 38 23.00	2.0522	23 4 57.2	8.991
9	18 55 58.36	2.2992	28 4 43.1	3.412	9	20 40 25.97	2.0469	22 55 54.9	9.086
10	18 58 16.18	2.2947	28 1 14.1	3.553	10	20 42 28.63	2.0417	22 46 46.9	9.181
11	19 0 33.73	2.2902	27 57 36.7	3.692	11	20 44 30.97	2.0363	22 37 33.2	9.275
12	19 2 51.00	2.2855	27 53 51.1	3.829	12	20 46 32.99	2.0311	22 28 13.9	9.367
13	19 5 7.99	2.2807	27 49 57.2	3.967	13	20 48 34.70	2.0258	22 18 49.1	9.459
14	19 7 24.69	2.2760	27 45 55.0	4.104	14	20 50 36.09	2.0206	22 9 18.8	9.550
15	19 9 41.11	2.2712	27 41 44.7	4.240	15	20 52 37.17	2.0154	21 59 43.1	9.640
16	19 11 57.24	2.2663	27 37 26.2	4.375	16	20 54 37.94	2.0102	21 50 2.0	9.728
17	19 14 13.07	2.2614	27 32 59.7	4.508	17	20 56 38.40	2.0052	21 40 15.6	9.817
18	19 16 28.61	2.2564	27 28 25.2	4.642	18	20 58 38.56	2.0001	21 30 24.0	9.904
19	19 18 43.84	2.2514	27 23 42.7	4.774	19	21 0 38.41	1.9950	21 20 27.2	9.989
20	19 20 58.78	2.2464	27 18 52.3	4.906	20	21 2 37.96	1.9900	21 10 25.3	10.075
21	19 23 13.41	2.2412	27 13 54.0	5.036	21	21 4 37.21	1.9850	21 0 18.2	10.160
22	19 25 27.73	2.2362	27 8 48.0	5.165	22	21 6 36.16	1.9800	20 50 6.1	10.243
23	19 27 41.75	2.2310	S. 27 3 34.2	5.294	23	21 8 34.81	1.9751	S. 20 39 49.0	10.325
SUNDAY 30.					TUESDAY, APRIL 1.				
0	19 29 55.45	2.2257	S. 26 58 12.7	5.422	0	21 10 33.17	1.9702	S. 20 29 27.1	10.406
1	19 32 8.84	2.2206	26 52 43.6	5.548	PHASES OF THE MOON.				
2	19 34 21.92	2.2153	26 47 6.9	5.673					
3	19 36 34.68	2.2100	26 41 22.7	5.797					
4	19 38 47.12	2.2047	26 35 31.1	5.922					
5	19 40 59.24	2.1993	26 29 32.1	6.045	<div></div> <div>● New Moon . . . Mar. 7 12 22.5</div> <div>☾ First Quarter . . . 15 8 58.0</div> <div>○ Full Moon . . . 21 23 56.2</div> <div>☾ Last Quarter . . . 29 0 57.7</div>				
6	19 43 11.04	2.1940	26 23 25.8	6.166					
7	19 45 22.52	2.1886	26 17 12.2	6.287					
8	19 47 33.67	2.1832	26 10 51.3	6.407					
9	19 49 44.50	2.1777	26 4 23.3	6.526	<div></div> <div>☾ Apogee . . . Mar. 5 20.6</div> <div>☾ Perigee . . . 20 23.6</div>				
10	19 51 55.00	2.1723	25 57 48.2	6.644					
11	19 54 5.18	2.1669	25 51 6.0	6.762					
12	19 56 15.03	2.1614	25 44 16.8	6.877					
13	19 58 24.55	2.1559	25 37 20.7	6.992					
14	20 0 33.74	2.1505	25 30 17.8	7.105					
15	20 2 42.61	2.1450	25 23 8.1	7.218					
16	20 4 51.14	2.1394	25 15 51.6	7.331					
17	20 6 59.34	2.1340	25 8 28.4	7.442					
18	20 9 7.22	2.1286	25 0 58.6	7.552					
19	20 11 14.77	2.1230	24 53 22.2	7.661					
20	20 13 21.98	2.1176	24 45 39.3	7.769					
21	20 15 28.87	2.1120	24 37 49.9	7.877					
22	20 17 35.42	2.1065	24 29 54.1	7.982					
23	20 19 41.65	2.1011	24 21 52.0	8.087					
24	20 21 47.55	2.0956	S. 24 13 43.6	8.192					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to		Diff. for 1 Hour.				
		Apparent Right Ascension.			Diff. for 1 Hour.	Apparent Declination.			Diff. for 1 Hour.	Semidiameter.		Subtracted from Apparent Time.			
		h	m	s	s	°	'	"	"	'	"	s	m	s	s
Tues.	1	0	41	2.02	9.100	N. 4	25	4.5	+57.93	16	1.81	64.47	4	4.21	0.754
Wed.	2	0	44	40.50	9.105	4	48	12.5	57.72	16	1.53	64.49	3	46.18	0.749
Thur.	3	0	48	19.11	9.111	5	11	15.4	57.50	16	1.25	64.51	3	28.28	0.743
Fri.	4	0	51	57.87	9.118	5	34	12.9	+57.27	16	0.97	64.53	3	10.53	0.736
Sat.	5	0	55	36.80	9.126	5	57	4.7	57.02	16	0.69	64.55	2	52.95	0.729
SUN.	6	0	59	15.90	9.134	6	19	50.4	56.76	16	0.41	64.58	2	35.55	0.721
Mon.	7	1	2	55.20	9.142	6	42	29.5	+56.48	16	0.13	64.61	2	18.34	0.712
Tues.	8	1	6	34.72	9.151	7	5	1.7	56.19	15	59.86	64.65	2	1.35	0.703
Wed.	9	1	10	14.47	9.161	7	27	26.6	55.88	15	59.59	64.69	1	44.59	0.693
Thur.	10	1	13	54.45	9.171	7	49	43.9	+55.56	15	59.32	64.73	1	28.07	0.683
Fri.	11	1	17	34.68	9.182	8	11	53.3	55.22	15	59.06	64.77	1	11.80	0.672
Sat.	12	1	21	15.18	9.193	8	33	54.3	54.86	15	58.79	64.81	0	55.79	0.661
SUN.	13	1	24	55.97	9.206	8	55	46.6	+54.49	15	58.53	64.85	0	40.06	0.649
Mon.	14	1	28	37.06	9.219	9	17	29.8	54.11	15	58.26	64.90	0	24.63	0.636
Tues.	15	1	32	18.46	9.233	9	39	3.7	53.71	15	58.00	64.95	0	9.52	0.623
Wed.	16	1	36	0.19	9.247	10	0	27.9	+53.30	15	57.74	65.00	0	5.26	0.609
Thur.	17	1	39	42.27	9.261	10	21	42.1	52.87	15	57.48	65.05	0	19.69	0.594
Fri.	18	1	43	24.71	9.277	10	42	45.9	52.44	15	57.22	65.11	0	33.76	0.579
Sat.	19	1	47	7.53	9.293	11	3	39.1	+51.99	15	56.96	65.17	0	47.46	0.563
SUN.	20	1	50	50.76	9.310	11	24	21.4	51.53	15	56.70	65.23	1	0.76	0.545
Mon.	21	1	54	34.41	9.328	11	44	52.5	51.05	15	56.44	65.29	1	13.64	0.527
Tues.	22	1	58	18.49	9.346	12	5	12.1	+50.56	15	56.18	65.36	1	26.08	0.509
Wed.	23	2	2	3.02	9.365	12	25	19.8	50.07	15	55.92	65.43	1	38.07	0.490
Thur.	24	2	5	48.02	9.385	12	45	15.4	49.56	15	55.66	65.49	1	49.60	0.470
Fri.	25	2	9	33.50	9.405	13	4	58.5	+49.03	15	55.41	65.56	2	0.64	0.450
Sat.	26	2	13	19.47	9.426	13	24	28.9	48.50	15	55.15	65.63	2	11.18	0.429
SUN.	27	2	17	5.95	9.447	13	43	46.3	47.95	15	54.90	65.70	2	21.22	0.408
Mon.	28	2	20	52.96	9.469	14	2	50.2	+47.38	15	54.65	65.77	2	30.75	0.386
Tues.	29	2	24	40.50	9.492	14	21	40.3	46.80	15	54.40	65.84	2	39.75	0.364
Wed.	30	2	28	28.57	9.515	14	40	16.4	46.21	15	54.15	65.92	2	48.21	0.341
Thur.	31	2	32	17.18	9.538	N. 14	58	38.2	+45.60	15	53.90	66.00	2	56.13	0.319

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0°.18 from the sidereal time.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.		
		h m s	s	° ' "	"	m s	s	h m s
Tues.	1	0 41 1.41	9.102	N. 4 25 0.5	+57.95	4 4.25	0.754	0 36 57.15
Wed.	2	0 44 39.93	9.107	4 48 8.9	57.74	3 46.22	0.749	0 40 53.71
Thur.	3	0 48 18.58	9.113	5 11 12.2	57.52	3 28.32	0.743	0 44 50.26
Fri.	4	0 51 57.39	9.120	5 34 10.0	+57.29	3 10.57	0.736	0 48 46.81
Sat.	5	0 55 36.36	9.127	5 57 2.0	57.04	2 52.99	0.729	0 52 43.37
SUN.	6	0 59 15.51	9.135	6 19 47.9	56.78	2 35.59	0.721	0 56 39.92
Mon.	7	1 2 54.85	9.144	6 42 27.3	+56.50	2 18.38	0.712	1 0 36.48
Tues.	8	1 6 34.41	9.153	7 4 59.8	56.20	2 1.38	0.703	1 4 33.03
Wed.	9	1 10 14.20	9.163	7 27 25.0	55.89	1 44.61	0.693	1 8 29.58
Thur.	10	1 13 54.22	9.173	7 49 42.6	+55.57	1 28.08	0.683	1 12 26.14
Fri.	11	1 17 34.50	9.184	8 11 52.2	55.23	1 11.81	0.672	1 16 22.69
Sat.	12	1 21 15.04	9.195	8 33 53.5	54.87	0 55.80	0.661	1 20 19.25
SUN.	13	1 24 55.87	9.207	8 55 46.0	+54.50	0 40.07	0.649	1 24 15.80
Mon.	14	1 28 37.00	9.220	9 17 29.5	54.12	0 24.64	0.636	1 28 12.36
Tues.	15	1 32 18.44	9.234	9 39 3.6	53.72	0 9.53	0.623	1 32 8.91
Wed.	16	1 36 0.21	9.248	10 0 28.0	+53.31	0 5.25	0.609	1 36 5.46
Thur.	17	1 39 42.33	9.262	10 21 42.4	52.88	0 19.69	0.594	1 40 2.02
Fri.	18	1 43 24.80	9.278	10 42 46.4	52.45	0 33.77	0.579	1 43 58.58
Sat.	19	1 47 7.66	9.294	11 3 39.8	+52.00	0 47.47	0.563	1 47 55.13
SUN.	20	1 50 50.92	9.311	11 24 22.3	51.54	1 0.76	0.545	1 51 51.68
Mon.	21	1 54 34.60	9.329	11 44 53.6	51.06	1 13.64	0.527	1 55 48.24
Tues.	22	1 58 18.71	9.347	12 5 13.3	+50.57	1 26.09	0.509	1 59 44.80
Wed.	23	2 2 3.27	9.366	12 25 21.2	50.08	1 38.08	0.490	2 3 41.35
Thur.	24	2 5 48.30	9.386	12 45 16.9	49.57	1 49.61	0.470	2 7 37.90
Fri.	25	2 9 33.81	9.407	13 5 0.2	+49.04	2 0.65	0.450	2 11 34.46
Sat.	26	2 13 19.81	9.428	13 24 30.7	48.50	2 11.20	0.429	2 15 31.02
SUN.	27	2 17 6.32	9.449	13 43 48.2	47.95	2 21.24	0.408	2 19 27.57
Mon.	28	2 20 53.35	9.471	14 2 52.2	+47.38	2 30.77	0.386	2 23 24.13
Tues.	29	2 24 40.91	9.493	14 21 42.4	46.80	2 39.77	0.364	2 27 20.68
Wed.	30	2 28 29.01	9.515	14 40 18.6	46.21	2 48.23	0.341	2 31 17.24
Thur.	31	2 32 17.65	9.538	N. 14 58 40.4	+45.60	2 56.15	0.319	2 35 13.80

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour
+9°.8565.
(Table III.)

AT GREENWICH MEAN NOON.													
Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.			
		True Longitude.			Diff. for 1 Hour.	Latitude.							
		λ											
		°	'	"	'	"	"	"			h	m	s
1	91	11	9	46.3	9	35.1	147.95	−0.46	9.999 8601	+53.2	23	19	12.99
2	92	12	8	56.3	8	44.9	147.88	0.36	9.999 9875	53.0	23	15	17.08
3	93	13	8	4.4	7	52.8	147.80	0.25	0.000 1145	52.8	23	11	21.18
4	94	14	7	10.6	6	58.9	147.72	−0.13	0.000 2410	+52.6	23	7	25.27
5	95	15	6	14.9	6	3.1	147.64	−0.01	0.000 3669	52.3	23	3	29.36
6	96	16	5	17.2	5	5.3	147.55	+0.11	0.000 4920	52.0	22	59	33.45
7	97	17	4	17.5	4	5.5	147.47	+0.24	0.000 6163	+51.6	22	55	37.54
8	98	18	3	15.7	3	3.6	147.38	0.36	0.000 7399	51.3	22	51	41.63
9	99	19	2	11.8	1	59.6	147.29	0.45	0.000 8626	51.0	22	47	45.73
10	100	20	1	5.7	0	53.4	147.20	+0.52	0.000 9845	+50.6	22	43	49.82
11	101	20	59	57.4	59	45.0	147.11	0.57	0.001 1056	50.3	22	39	53.91
12	102	21	58	46.9	58	34.4	147.01	0.59	0.001 2259	50.0	22	35	58.00
13	103	22	57	34.2	57	21.5	146.92	+0.57	0.001 3456	+49.8	22	32	2.09
14	104	23	56	19.2	56	6.3	146.82	0.52	0.001 4647	49.6	22	28	6.18
15	105	24	55	1.8	54	48.8	146.73	0.44	0.001 5833	49.4	22	24	10.28
16	106	25	53	42.1	53	29.0	146.64	+0.33	0.001 7016	+49.3	22	20	14.37
17	107	26	52	20.2	52	7.0	146.54	0.20	0.001 8197	49.2	22	16	18.46
18	108	27	50	56.2	50	42.9	146.45	+0.07	0.001 9376	49.1	22	12	22.55
19	109	28	49	30.1	49	16.6	146.37	−0.08	0.002 0555	+49.1	22	8	26.64
20	110	29	48	1.9	47	48.3	146.29	0.22	0.002 1733	49.0	22	4	30.73
21	111	30	46	31.8	46	18.1	146.21	0.34	0.002 2911	49.0	22	0	34.82
22	112	31	44	59.8	44	46.0	146.13	−0.45	0.002 4087	+48.9	21	56	38.91
23	113	32	43	26.0	43	12.1	146.06	0.53	0.002 5262	48.8	21	52	43.00
24	114	33	41	50.6	41	36.5	145.99	0.59	0.002 6434	48.7	21	48	47.10
25	115	34	40	13.6	39	59.3	145.92	−0.61	0.002 7602	+48.5	21	44	51.19
26	116	35	38	34.9	38	20.5	145.86	0.60	0.002 8764	48.2	21	40	55.28
27	117	36	36	54.7	36	40.2	145.79	0.57	0.002 9918	47.9	21	36	59.37
28	118	37	35	12.9	34	58.3	145.73	−0.51	0.003 1064	+47.5	21	33	3.46
29	119	38	33	29.6	33	14.8	145.66	0.42	0.003 2200	47.1	21	29	7.55
30	120	39	31	44.8	31	29.9	145.60	0.32	0.003 3325	46.6	21	25	11.64
31	121	40	29	58.4	29	43.4	145.54	−0.22	0.003 4438	+46.1	21	21	15.73

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour.
−9^s.8296.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S

SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
' "	' "	' "	"	' "	"	h m	m	d
4 46.8	14 45.6	54 8.88	−0.466	54 4.42	−0.281	21 10.9	1.76	24.5
4 45.0	14 44.9	54 2.12	−0.104	54 1.87	+0.060	21 52.1	1.68	25.5
4 45.4	14 46.3	54 3.52	+0.212	54 6.92	0.351	22 31.8	1.64	26.5
4 47.7	14 49.4	54 11.91	+0.478	54 18.34	+0.591	23 11.1	1.64	27.5
4 51.5	14 54.0	54 26.06	0.694	54 34.95	0.785	23 50.9	1.68	28.5
4 56.6	14 59.6	54 44.87	0.866	54 55.71	0.939	0	.	29.5
5 2.8	15 6.2	55 7.39	+1.005	55 19.82	+1.064	0 32.3	1.77	0.8
5 9.8	15 13.5	55 32.93	1.119	55 46.68	1.172	1 16.3	1.91	1.8
5 17.4	15 21.5	56 1.03	1.222	56 15.97	1.270	2 4.0	2.07	2.8
5 25.7	15 30.1	56 31.50	+1.318	56 47.60	+1.364	2 55.9	2.25	3.8
5 34.6	15 39.3	57 4.24	1.408	57 21.38	1.446	3 51.9	2.40	4.8
5 44.1	15 49.0	57 38.93	1.477	57 56.80	1.499	4 50.8	2.49	5.8
5 53.9	15 58.8	58 14.86	+1.508	58 32.93	+1.501	5 50.7	2.49	6.8
6 3.7	16 8.4	58 50.79	1.471	59 8.12	1.412	6 49.5	2.40	7.8
6 12.9	16 17.0	59 24.56	1.324	59 39.77	1.206	7 45.7	2.28	8.8
6 20.7	16 23.9	59 53.36	+1.053	60 4.89	+0.863	8 39.0	2.17	9.8
6 26.3	16 28.0	60 13.92	0.638	60 20.07	+0.383	9 30.0	2.09	10.8
6 28.8	16 28.6	60 23.00	+0.103	60 22.47	−0.194	10 19.7	2.07	11.8
6 27.5	16 25.4	60 18.31	−0.498	60 10.51	−0.800	11 9.5	2.10	12.8
6 22.3	16 18.3	59 59.14	1.091	59 44.40	1.358	12 0.6	2.17	13.8
6 13.4	16 7.9	59 26.65	1.594	59 6.29	1.792	12 53.8	2.27	14.8
6 1.8	15 55.2	58 43.81	−1.947	58 19.74	−2.056	13 49.5	2.36	15.8
5 48.4	15 41.4	57 54.67	2.116	57 29.14	2.133	14 46.8	2.41	16.8
5 34.5	15 27.7	57 3.67	2.107	56 38.76	2.038	15 44.4	2.37	17.8
5 21.2	15 15.1	56 14.91	−1.933	55 52.48	−1.801	16 40.2	2.27	18.8
5 9.4	15 4.3	55 31.78	1.644	55 13.09	1.469	17 32.9	2.11	19.8
4 59.8	14 56.0	54 56.62	1.275	54 42.54	1.069	18 21.7	1.96	20.8
4 52.9	14 50.4	54 30.97	−0.858	54 21.94	−0.645	19 6.9	1.81	21.8
4 48.6	14 47.6	54 15.49	0.431	54 11.59	−0.220	19 49.0	1.71	22.8
4 47.2	14 47.5	54 10.18	−0.016	54 11.18	+0.179	20 29.2	1.65	23.8
4 48.4	14 49.8	54 14.48	+0.365	54 19.91	0.536	21 8.6	1.64	24.8
4 51.9	14 54.4	54 27.31	+0.695	54 36.51	+0.836	21 48.0	1.67	25.8

APRIL, 1913.**GREENWICH MEAN TIME.****THE MOON'S RIGHT ASCENSION AND DECLINATION.**

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 21.					WEDNESDAY 23.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	14 21 45.25	2.3019	S. 17 21 55.3	14.111	0	16 16 26.37	2.4614	S. 26 4 59.5	7.245
1	14 24 3.48	2.3057	17 35 58.6	13.998	1	16 18 54.11	2.4632	26 12 9.2	7.078
2	14 26 21.94	2.3095	17 49 55.0	13.883	2	16 21 21.96	2.4650	26 19 8.9	6.912
3	14 28 40.62	2.3133	18 3 44.5	13.767	3	16 23 49.91	2.4667	26 25 58.6	6.745
4	14 30 59.54	2.3172	18 17 27.0	13.650	4	16 26 17.96	2.4683	26 32 38.3	6.577
5	14 33 18.69	2.3211	18 31 2.5	13.532	5	16 28 46.10	2.4698	26 39 7.8	6.408
6	14 35 38.07	2.3250	18 44 30.8	13.412	6	16 31 14.33	2.4711	26 45 27.2	6.239
7	14 37 57.69	2.3289	18 57 51.9	13.290	7	16 33 42.63	2.4723	26 51 36.5	6.070
8	14 40 17.54	2.3327	19 11 5.6	13.166	8	16 36 11.00	2.4734	26 57 35.6	5.900
9	14 42 37.62	2.3366	19 24 11.8	13.041	9	16 38 39.44	2.4745	27 3 24.5	5.731
10	14 44 57.93	2.3404	19 37 10.5	12.915	10	16 41 7.94	2.4755	27 9 3.3	5.561
11	14 47 18.47	2.3443	19 50 1.6	12.788	11	16 43 36.50	2.4763	27 14 31.8	5.390
12	14 49 39.25	2.3482	20 2 45.1	12.659	12	16 46 5.10	2.4769	27 19 50.1	5.219
13	14 52 0.26	2.3521	20 15 20.7	12.528	13	16 48 33.73	2.4775	27 24 58.1	5.048
14	14 54 21.50	2.3559	20 27 48.5	12.397	14	16 51 2.40	2.4780	27 29 55.9	4.877
15	14 56 42.97	2.3598	20 40 8.4	12.264	15	16 53 31.09	2.4783	27 34 43.4	4.706
16	14 59 4.67	2.3636	20 52 20.2	12.129	16	16 55 59.80	2.4786	27 39 20.6	4.534
17	15 1 26.60	2.3673	21 4 23.9	11.993	17	16 58 28.52	2.4787	27 43 47.5	4.363
18	15 3 48.75	2.3711	21 16 19.4	11.857	18	17 0 57.24	2.4787	27 48 4.2	4.192
19	15 6 11.13	2.3748	21 28 6.7	11.718	19	17 3 25.96	2.4786	27 52 10.5	4.020
20	15 8 33.73	2.3785	21 39 45.6	11.578	20	17 5 54.67	2.4783	27 56 6.6	3.848
21	15 10 56.55	2.3822	21 51 16.1	11.437	21	17 8 23.36	2.4779	27 59 52.3	3.677
22	15 13 19.59	2.3858	22 2 38.1	11.296	22	17 10 52.02	2.4774	28 3 27.8	3.506
23	15 15 42.85	2.3895	S. 22 13 51.6	11.153	23	17 13 20.65	2.4768	S. 28 6 53.0	3.334
TUESDAY 22.					THURSDAY 24.				
0	15 18 6.33	2.3931	S. 22 24 56.4	11.008	0	17 15 49.24	2.4761	S. 28 10 7.9	3.163
1	15 20 30.02	2.3967	22 35 52.5	10.862	1	17 18 17.78	2.4753	28 13 12.5	2.991
2	15 22 53.93	2.4002	22 46 39.9	10.716	2	17 20 46.27	2.4743	28 16 6.8	2.820
3	15 25 18.04	2.4036	22 57 18.4	10.568	3	17 23 14.69	2.4731	28 18 50.9	2.649
4	15 27 42.36	2.4070	23 7 48.0	10.418	4	17 25 43.04	2.4718	28 21 24.7	2.478
5	15 30 6.88	2.4103	23 18 8.6	10.268	5	17 28 11.31	2.4705	28 23 48.3	2.308
6	15 32 31.60	2.4137	23 28 20.2	10.117	6	17 30 39.50	2.4691	28 26 1.7	2.138
7	15 34 56.52	2.4169	23 38 22.7	9.965	7	17 33 7.60	2.4675	28 28 4.9	1.968
8	15 37 21.63	2.4201	23 48 16.0	9.812	8	17 35 35.60	2.4658	28 29 57.9	1.799
9	15 39 46.93	2.4232	23 58 0.1	9.658	9	17 38 3.49	2.4639	28 31 40.8	1.630
10	15 42 12.41	2.4263	24 7 34.9	9.503	10	17 40 31.27	2.4620	28 33 13.5	1.461
11	15 44 38.08	2.4293	24 17 0.4	9.347	11	17 42 58.93	2.4599	28 34 36.1	1.292
12	15 47 3.92	2.4322	24 26 16.5	9.190	12	17 45 26.46	2.4577	28 35 48.6	1.124
13	15 49 29.94	2.4351	24 35 23.2	9.032	13	17 47 53.86	2.4554	28 36 51.0	0.957
14	15 51 56.13	2.4379	24 44 20.4	8.873	14	17 50 21.11	2.4529	28 37 43.4	0.790
15	15 54 22.49	2.4407	24 53 8.0	8.713	15	17 52 48.21	2.4504	28 38 25.8	0.623
16	15 56 49.01	2.4433	25 1 46.0	8.553	16	17 55 15.16	2.4477	28 38 58.2	0.457
17	15 59 15.68	2.4458	25 10 14.4	8.392	17	17 57 41.94	2.4449	28 39 20.7	0.292
18	16 1 42.51	2.4483	25 18 33.1	8.231	18	18 0 8.55	2.4420	28 39 33.3	-0.127
19	16 4 9.48	2.4507	25 26 42.1	8.068	19	18 2 34.98	2.4390	28 39 36.0	+0.037
20	16 6 36.60	2.4531	25 34 41.3	7.905	20	18 5 1.23	2.4359	28 39 28.9	0.200
21	16 9 3.85	2.4553	25 42 30.7	7.741	21	18 7 27.29	2.4327	28 39 12.0	0.363
22	16 11 31.23	2.4574	25 50 10.2	7.576	22	18 9 53.15	2.4293	28 38 45.3	0.526
23	16 13 58.74	2.4595	25 57 39.8	7.411	23	18 12 18.81	2.4259	28 38 8.9	0.687
24	16 16 26.37	2.4614	S. 26 4 59.5	7.245	24	18 14 44.26	2.4223	S. 28 37 22.8	0.848

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 25.					SUNDAY 27.				
	<div>h m s</div>	<div>° ' "</div>				<div>h m s</div>	<div>° ' "</div>		
0	18 14 44.26	2.4223	S. 28 37 22.8	0.848	0	20 5 23.27	2.1676	S. 25 8 17.6	7.471
1	18 17 9.49	2.4187	28 36 27.1	1.008	1	20 7 33.14	2.1614	25 0 46.0	7.582
2	18 19 34.50	2.4149	28 35 21.8	1.168	2	20 9 42.64	2.1553	24 53 7.8	7.692
3	18 21 59.28	2.4111	28 34 7.0	1.327	3	20 11 51.78	2.1492	24 45 22.9	7.802
4	18 24 23.83	2.4072	28 32 42.6	1.485	4	20 14 0.55	2.1431	24 37 31.5	7.911
5	18 26 48.14	2.4031	28 31 8.8	1.642	5	20 16 8.95	2.1369	24 29 33.6	8.018
6	18 29 12.20	2.3989	28 29 25.6	1.798	6	20 18 16.98	2.1308	24 21 29.3	8.125
7	18 31 36.01	2.3947	28 27 33.1	1.953	7	20 20 24.64	2.1247	24 13 18.6	8.230
8	18 33 59.56	2.3903	28 25 31.2	2.108	8	20 22 31.94	2.1186	24 5 1.7	8.333
9	18 36 22.85	2.3859	28 23 20.1	2.262	9	20 24 38.87	2.1125	23 56 38.6	8.437
10	18 38 45.87	2.3814	28 20 59.8	2.415	10	20 26 45.44	2.1064	23 48 9.3	8.539
11	18 41 8.62	2.3768	28 18 30.3	2.567	11	20 28 51.64	2.1003	23 39 33.9	8.640
12	18 43 31.09	2.3722	28 15 51.7	2.718	12	20 30 57.48	2.0943	23 30 52.5	8.740
13	18 45 53.28	2.3674	28 13 4.1	2.868	13	20 33 2.96	2.0883	23 22 5.1	8.838
14	18 48 15.18	2.3625	28 10 7.5	3.017	14	20 35 8.08	2.0823	23 13 11.9	8.936
15	18 50 36.78	2.3576	28 7 2.0	3.166	15	20 37 12.84	2.0764	23 4 12.8	9.033
16	18 52 58.09	2.3527	28 3 47.6	3.313	16	20 39 17.25	2.0705	22 55 8.0	9.128
17	18 55 19.10	2.3476	28 0 24.4	3.459	17	20 41 21.30	2.0646	22 45 57.5	9.222
18	18 57 39.80	2.3424	27 56 52.5	3.604	18	20 43 25.00	2.0587	22 36 41.3	9.316
19	19 0 0.19	2.3372	27 53 11.9	3.749	19	20 45 28.35	2.0528	22 27 19.6	9.408
20	19 2 20.27	2.3320	27 49 22.6	3.892	20	20 47 31.34	2.0470	22 17 52.3	9.500
21	19 4 40.03	2.3267	27 45 24.8	4.034	21	20 49 33.99	2.0412	22 8 19.6	9.591
22	19 6 59.47	2.3213	27 41 18.5	4.176	22	20 51 36.29	2.0355	21 58 41.4	9.681
23	19 9 18.58	2.3158	S. 27 37 3.7	4.317	23	20 53 38.25	2.0298	S. 21 48 57.9	9.768
SATURDAY 26.					MONDAY 28.				
	<div>h m s</div>	<div>° ' "</div>				<div>h m s</div>	<div>° ' "</div>		
0	19 11 37.37	2.3103	S. 27 32 40.5	4.456	0	20 55 39.87	2.0242	S. 21 39 9.2	9.855
1	19 13 55.82	2.3048	27 28 9.0	4.594	1	20 57 41.15	2.0185	21 29 15.3	9.942
2	19 16 13.94	2.2992	27 23 29.2	4.731	2	20 59 42.09	2.0129	21 19 16.2	10.028
3	19 18 31.72	2.2935	27 18 41.3	4.867	3	21 1 42.70	2.0073	21 9 12.0	10.112
4	19 20 49.16	2.2878	27 13 45.2	5.002	4	21 3 42.97	2.0018	20 59 2.8	10.195
5	19 23 6.26	2.2821	27 8 41.1	5.135	5	21 5 42.92	1.9964	20 48 48.6	10.277
6	19 25 23.01	2.2763	27 3 29.0	5.268	6	21 7 42.54	1.9909	20 38 29.5	10.359
7	19 27 39.41	2.2704	26 58 8.9	5.400	7	21 9 41.83	1.9855	20 28 5.5	10.439
8	19 29 55.46	2.2646	26 52 41.0	5.530	8	21 11 40.80	1.9802	20 17 36.8	10.518
9	19 32 11.16	2.2587	26 47 5.3	5.660	9	21 13 39.46	1.9750	20 7 3.3	10.597
10	19 34 26.50	2.2528	26 41 21.8	5.789	10	21 15 37.80	1.9697	19 56 25.1	10.675
11	19 36 41.49	2.2468	26 35 30.6	5.917	11	21 17 35.82	1.9645	19 45 42.3	10.752
12	19 38 56.12	2.2408	26 29 31.8	6.043	12	21 19 33.54	1.9594	19 34 54.9	10.828
13	19 41 10.39	2.2348	26 23 25.5	6.168	13	21 21 30.95	1.9543	19 24 3.0	10.902
14	19 43 24.30	2.2288	26 17 11.7	6.292	14	21 23 28.05	1.9492	19 13 6.7	10.976
15	19 45 37.84	2.2227	26 10 50.5	6.414	15	21 25 24.85	1.9442	19 2 5.9	11.049
16	19 47 51.02	2.2167	26 4 22.0	6.536	16	21 27 21.36	1.9393	18 51 0.8	11.122
17	19 50 3.84	2.2106	25 57 46.2	6.657	17	21 29 17.57	1.9344	18 39 51.3	11.193
18	19 52 16.29	2.2044	25 51 3.2	6.776	18	21 31 13.49	1.9296	18 28 37.6	11.263
19	19 54 28.37	2.1983	25 44 13.1	6.894	19	21 33 9.12	1.9248	18 17 19.8	11.332
20	19 56 40.09	2.1922	25 37 15.9	7.012	20	21 35 4.46	1.9201	18 5 57.8	11.401
21	19 58 51.44	2.1861	25 30 11.7	7.128	21	21 36 59.53	1.9155	17 54 31.7	11.468
22	20 1 2.42	2.1799	25 23 0.5	7.243	22	21 38 54.32	1.9108	17 43 1.6	11.535
23	20 3 13.03	2.1738	25 15 42.5	7.358	23	21 40 48.83	1.9063	17 31 27.5	11.601
24	20 5 23.27	2.1676	S. 25 8 17.6	7.471	24	21 42 43.07	1.9018	S. 17 19 49.5	11.666

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^m.19
sidereal time.
The sign + prefixed to the hourly change of declination indicates that north declinations are in-

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.					
		Apparent Right Ascension.			Diff. for 1 Hour.	Apparent Declination.					Diff. for 1 Hour.				
		h	m	s	s	°	'	"	"	m	s	s	h	m	s
Thur.	1	2	32	17.65	9.538	N.14	58	40.4	+45.60	2	56.15	0.319	2	35	13.80
Fri.	2	2	36	6.83	9.561	15	16	47.5	44.98	3	3.52	0.296	2	39	10.35
Sat.	3	2	39	56.57	9.584	15	34	39.5	44.34	3	10.34	0.273	2	43	6.91
SUN.	4	2	43	46.87	9.607	15	52	16.0	+43.69	3	16.60	0.249	2	47	3.46
Mon.	5	2	47	37.73	9.631	16	9	36.8	43.03	3	22.29	0.226	2	51	0.02
Tues.	6	2	51	29.16	9.654	16	26	41.6	42.36	3	27.42	0.202	2	54	56.58
Wed.	7	2	55	21.15	9.678	16	43	29.9	+41.67	3	31.98	0.179	2	58	53.13
Thur.	8	2	59	13.70	9.701	17	0	1.5	40.96	3	35.98	0.155	3	2	49.69
Fri.	9	3	3	6.82	9.725	17	16	16.1	40.24	3	39.42	0.132	3	6	46.24
Sat.	10	3	7	0.50	9.749	17	32	13.3	+39.51	3	42.30	0.108	3	10	42.80
SUN.	11	3	10	54.73	9.772	17	47	52.8	38.77	3	44.62	0.085	3	14	39.36
Mon.	12	3	14	49.53	9.795	18	3	14.3	38.02	3	46.38	0.062	3	18	35.92
Tues.	13	3	18	44.88	9.818	18	18	17.6	+37.25	3	47.59	0.039	3	22	32.47
Wed.	14	3	22	40.78	9.841	18	33	2.3	36.47	3	48.24	0.016	3	26	29.03
Thur.	15	3	26	37.24	9.864	18	47	28.2	35.68	3	48.34	0.007	3	30	25.58
Fri.	16	3	30	34.25	9.887	19	1	35.0	+34.88	3	47.89	0.030	3	34	22.14
Sat.	17	3	34	31.81	9.910	19	15	22.5	34.07	3	46.89	0.053	3	38	18.70
SUN.	18	3	38	29.92	9.933	19	28	50.5	33.25	3	45.34	0.076	3	42	15.26
Mon.	19	3	42	28.57	9.955	19	41	58.6	+32.42	3	43.24	0.099	3	46	11.81
Tues.	20	3	46	27.77	9.978	19	54	46.6	31.58	3	40.60	0.122	3	50	8.37
Wed.	21	3	50	27.52	10.001	20	7	14.4	30.73	3	37.41	0.144	3	54	4.93
Thur.	22	3	54	27.81	10.024	20	19	21.6	+29.87	3	33.67	0.167	3	58	1.49
Fri.	23	3	58	28.64	10.046	20	31	8.1	29.00	3	29.40	0.189	4	1	58.04
Sat.	24	4	2	30.01	10.068	20	42	33.6	28.12	3	24.59	0.211	4	5	54.60
SUN.	25	4	6	31.91	10.090	20	53	37.8	+27.23	3	19.25	0.233	4	9	51.16
Mon.	26	4	10	34.32	10.111	21	4	20.5	26.33	3	13.40	0.254	4	13	47.72
Tues.	27	4	14	37.24	10.132	21	14	41.6	25.42	3	7.04	0.275	4	17	44.28
Wed.	28	4	18	40.65	10.152	21	24	40.7	+24.50	3	0.18	0.296	4	21	40.83
Thur.	29	4	22	44.55	10.172	21	34	17.7	23.57	2	52.84	0.316	4	25	37.39
Fri.	30	4	26	48.92	10.191	21	43	32.3	22.64	2	45.03	0.335	4	29	33.95
Sat.	31	4	30	53.74	10.210	21	52	24.4	21.70	2	36.76	0.354	4	33	30.51
SUN.	32	4	34	59.01	10.228	N.22	0	53.6	+20.74	2	28.05	0.371	4	37	27.06

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

Diff. for 1 Hour.
+9°.8565.
(Table III.)

AT GREENWICH MEAN NOON.

Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.			
		True Longitude.		Diff. for 1 Hour.	Latitude.								
		λ	λ'										
		$^{\circ}$	$'$	$''$	$'$	$''$	$''$	$''$			h	m	s
1	121	40	29	58.4	29	43.4	145.54	−0.22	0.003 4438	+46.1	21	21	15.73
2	122	41	28	10.6	27	55.4	145.47	−0.09	0.003 5536	45.5	21	17	19.82
3	123	42	26	21.2	26	5.8	145.40	+0.04	0.003 6620	44.8	21	13	23.91
4	124	43	24	30.2	24	14.7	145.34	+0.16	0.003 7689	+44.1	21	9	28.00
5	125	44	22	37.6	22	22.0	145.27	0.28	0.003 8741	43.4	21	5	32.09
6	126	45	20	43.4	20	27.7	145.21	0.37	0.003 9775	42.7	21	1	36.18
7	127	46	18	47.6	18	31.7	145.14	+0.44	0.004 0792	+42.0	20	57	40.26
8	128	47	16	50.1	16	34.0	145.07	0.49	0.004 1790	41.2	20	53	44.35
9	129	48	14	50.8	14	34.6	145.00	0.51	0.004 2770	40.5	20	49	48.44
10	130	49	12	49.8	12	33.4	144.92	+0.50	0.004 3733	+39.8	20	45	52.53
11	131	50	10	47.0	10	30.4	144.84	0.46	0.004 4679	39.1	20	41	56.62
12	132	51	8	42.4	8	25.6	144.77	0.38	0.004 5609	38.4	20	38	0.71
13	133	52	6	35.9	6	18.9	144.69	+0.28	0.004 6524	+37.8	20	34	4.80
14	134	53	4	27.6	4	10.5	144.62	0.15	0.004 7425	37.3	20	30	8.89
15	135	54	2	17.5	2	0.3	144.54	+0.02	0.004 8313	36.8	20	26	12.98
16	136	54	60	5.7	59	48.3	144.47	−0.13	0.004 9190	+36.3	20	22	17.07
17	137	55	57	52.3	57	34.7	144.40	0.27	0.005 0057	35.9	20	18	21.16
18	138	56	55	37.3	55	19.5	144.34	0.40	0.005 0914	35.5	20	14	25.25
19	139	57	53	20.8	53	2.8	144.28	−0.50	0.005 1762	+35.1	20	10	29.34
20	140	58	51	2.8	50	44.7	144.23	0.59	0.005 2601	34.7	20	6	33.42
21	141	59	48	43.5	48	25.3	144.17	0.66	0.005 3431	34.4	20	2	37.51
22	142	60	46	23.0	46	4.6	144.12	−0.69	0.005 4251	+34.0	19	58	41.60
23	143	61	44	1.4	43	42.8	144.07	0.69	0.005 5060	33.5	19	54	45.69
24	144	62	41	38.7	41	20.0	144.03	0.67	0.005 5857	33.0	19	50	49.78
25	145	63	39	15.0	38	56.1	143.99	−0.61	0.005 6642	+32.4	19	46	53.86
26	146	64	36	50.3	36	31.2	143.95	0.54	0.005 7413	31.8	19	42	57.95
27	147	65	34	24.7	34	5.4	143.91	0.44	0.005 8168	31.1	19	39	2.04
28	148	66	31	58.3	31	38.8	143.88	−0.33	0.005 8907	+30.4	19	35	6.13
29	149	67	29	31.0	29	11.3	143.84	0.22	0.005 9629	29.6	19	31	10.22
30	150	68	27	2.8	26	42.9	143.81	−0.10	0.006 0332	28.8	19	27	14.30
31	151	69	24	33.8	24	13.7	143.77	+0.03	0.006 1015	28.0	19	23	18.39
32	152	70	22	3.9	21	43.7	143.74	+0.14	0.006 1677	+27.1	19	19	22.48

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
−9°.8296.
(Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	14 48.4	14 49.8	54 14.48	+0.365	54 19.91	+0.536	21 8.6	1.64	24.8
2	14 51.9	14 54.4	54 27.31	0.695	54 36.51	0.836	21 48.0	1.67	25.8
3	14 57.3	15 0.6	54 47.29	0.958	54 59.43	1.063	22 28.9	1.75	26.8
4	15 4.2	15 8.1	55 12.73	+1.149	55 26.94	+1.215	23 12.3	1.88	27.8
5	15 12.2	15 16.4	55 41.84	1.264	55 57.21	1.295	23 59.2	2.04	28.8
6	15 20.6	15 24.9	56 12.85	1.308	56 28.56	1.307	0	.	0.1
7	15 29.2	15 33.4	56 44.18	+1.293	56 59.55	+1.266	0 50.5	2.23	1.1
8	15 37.4	15 41.4	57 14.56	1.233	57 29.13	1.194	1 46.1	2.40	2.1
9	15 45.2	15 48.9	57 43.19	1.148	57 56.66	1.097	2 45.1	2.49	3.1
10	15 52.4	15 55.7	58 9.51	+1.043	58 21.70	+0.988	3 45.4	2.50	4.1
11	15 58.9	16 1.8	58 33.23	0.931	58 44.05	0.871	4 44.6	2.42	5.1
12	16 4.6	16 7.1	58 54.11	0.803	59 3.32	0.730	5 41.0	2.28	6.1
13	16 9.3	16 11.3	59 11.57	+0.645	59 18.74	+0.549	6 34.1	2.14	7.1
14	16 12.9	16 14.1	59 24.69	0.441	59 29.24	0.316	7 24.3	2.05	8.1
15	16 14.9	16 15.3	59 32.20	+0.177	59 33.40	+0.021	8 12.7	2.00	9.1
16	16 15.1	16 14.3	59 32.64	-0.150	59 29.76	-0.332	9 0.8	2.02	10.1
17	16 12.9	16 10.9	59 24.63	0.523	59 17.20	0.716	9 49.8	2.08	11.1
18	16 8.2	16 4.9	59 7.45	0.908	58 55.42	1.094	10 40.9	2.19	12.1
19	16 1.0	15 56.7	58 41.25	-1.265	58 25.13	-1.417	11 34.9	2.31	13.1
20	15 51.8	15 46.6	58 7.33	1.545	57 48.15	1.647	12 31.5	2.40	14.1
21	15 41.1	15 35.4	57 27.94	1.716	57 7.08	1.753	13 29.6	2.42	15.1
22	15 29.7	15 24.0	56 46.00	-1.754	56 25.09	-1.725	14 27.1	2.36	16.1
23	15 18.4	15 13.1	56 4.74	1.662	55 45.30	1.572	15 22.2	2.22	17.1
24	15 8.1	15 3.6	55 27.13	1.452	55 10.53	1.309	16 13.4	2.05	18.1
25	14 59.6	14 56.1	54 55.77	-1.148	54 43.05	-0.970	17 0.6	1.89	19.1
26	14 53.3	14 51.1	54 32.57	0.775	54 24.50	0.570	17 44.2	1.76	20.1
27	14 49.6	14 48.8	54 18.93	-0.357	54 15.93	-0.143	18 25.2	1.67	21.1
28	14 48.6	14 49.2	54 15.52	+0.073	54 17.68	+0.287	19 4.6	1.63	22.1
29	14 50.5	14 52.4	54 22.38	0.495	54 29.52	0.694	19 43.8	1.64	23.1
30	14 55.0	14 58.2	54 38.99	0.881	54 50.63	1.056	20 23.8	1.70	24.1
31	15 1.9	15 6.1	55 4.26	1.211	55 19.62	1.345	21 5.9	1.82	25.1
32	15 10.7	15 15.6	55 36.44	+1.455	55 54.44	+1.542	21 51.4	1.98	26.1

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 9.					SUNDAY 11.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	5 45 20.34	2.5593	N.28 31 20.7	1.143	0	7 48 12.28	2.5066	N.25 57 28.6	7.439
1	5 47 53.97	2.5616	28 32 23.9	0.963	1	7 50 42.55	2.5023	25 49 57.3	7.604
2	5 50 27.73	2.5637	28 33 16.3	0.783	2	7 53 12.56	2.4981	25 42 16.1	7.768
3	5 53 1.62	2.5658	28 33 57.9	0.602	3	7 55 42.32	2.4938	25 34 25.2	7.930
4	5 55 35.63	2.5677	28 34 28.6	0.421	4	7 58 11.82	2.4894	25 26 24.5	8.092
5	5 58 9.75	2.5695	28 34 48.4	0.240	5	8 0 41.05	2.4850	25 18 14.1	8.253
6	6 0 43.97	2.5711	28 34 57.4	+0.058	6	8 3 10.01	2.4804	25 9 54.1	8.413
7	6 3 18.28	2.5725	28 34 55.4	-0.124	7	8 5 38.70	2.4758	25 1 24.6	8.571
8	6 5 52.67	2.5737	28 34 42.5	0.306	8	8 8 7.11	2.4712	24 52 45.6	8.728
9	6 8 27.13	2.5749	28 34 18.7	0.488	9	8 10 35.24	2.4665	24 43 57.2	8.884
10	6 11 1.66	2.5759	28 33 43.9	0.672	10	8 13 3.09	2.4617	24 34 59.5	9.038
11	6 13 36.24	2.5767	28 32 58.1	0.855	11	8 15 30.65	2.4568	24 25 52.6	9.192
12	6 16 10.87	2.5774	28 32 1.3	1.038	12	8 17 57.91	2.4519	24 16 36.4	9.346
13	6 18 45.53	2.5779	28 30 53.5	1.221	13	8 20 24.88	2.4470	24 7 11.1	9.497
14	6 21 20.22	2.5782	28 29 34.8	1.404	14	8 22 51.55	2.4420	23 57 36.8	9.646
15	6 23 54.92	2.5784	28 28 5.0	1.588	15	8 25 17.92	2.4370	23 47 53.6	9.794
16	6 26 29.63	2.5785	28 26 24.2	1.772	16	8 27 43.99	2.4320	23 38 1.5	9.942
17	6 29 4.34	2.5784	28 24 32.4	1.955	17	8 30 9.76	2.4269	23 28 0.6	10.088
18	6 31 39.04	2.5781	28 22 29.6	2.138	18	8 32 35.22	2.4217	23 17 51.0	10.233
19	6 34 13.71	2.5776	28 20 15.8	2.322	19	8 35 0.36	2.4165	23 7 32.7	10.377
20	6 36 48.35	2.5771	28 17 51.0	2.505	20	8 37 25.20	2.4114	22 57 5.8	10.518
21	6 39 22.96	2.5764	28 15 15.2	2.688	21	8 39 49.73	2.4062	22 46 30.5	10.658
22	6 41 57.52	2.5756	28 12 28.5	2.870	22	8 42 13.94	2.4008	22 35 46.8	10.797
23	6 44 32.03	2.5746	N.28 9 30.8	3.052	23	8 44 37.83	2.3956	N.22 24 54.8	10.936
SATURDAY 10.					MONDAY 12.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	6 47 6.47	2.5733	N.28 6 22.2	3.235	0	8 47 1.41	2.3903	N.22 13 54.5	11.072
1	6 49 40.83	2.5720	28 3 2.6	3.417	1	8 49 24.67	2.3850	22 2 46.1	11.207
2	6 52 15.11	2.5706	27 59 32.1	3.598	2	8 51 47.61	2.3797	21 51 29.6	11.341
3	6 54 49.30	2.5690	27 55 50.8	3.779	3	8 54 10.23	2.3744	21 40 5.2	11.473
4	6 57 23.39	2.5673	27 51 58.6	3.960	4	8 56 32.53	2.3691	21 28 32.9	11.603
5	6 59 57.37	2.5654	27 47 55.6	4.141	5	8 58 54.52	2.3638	21 16 52.8	11.732
6	7 2 31.24	2.5634	27 43 41.7	4.321	6	9 1 16.19	2.3585	21 5 5.0	11.861
7	7 5 4.98	2.5612	27 39 17.1	4.499	7	9 3 37.53	2.3532	20 53 9.5	11.987
8	7 7 38.59	2.5589	27 34 41.8	4.678	8	9 5 58.57	2.3478	20 41 6.5	12.112
9	7 10 12.05	2.5565	27 29 55.7	4.857	9	9 8 19.28	2.3426	20 28 56.1	12.235
10	7 12 45.37	2.5541	27 24 59.0	5.034	10	9 10 39.68	2.3373	20 16 38.3	12.357
11	7 15 18.54	2.5514	27 19 51.6	5.212	11	9 12 59.76	2.3320	20 4 13.2	12.478
12	7 17 51.54	2.5486	27 14 33.6	5.388	12	9 15 19.52	2.3267	19 51 40.9	12.597
13	7 20 24.37	2.5457	27 9 5.1	5.563	13	9 17 38.97	2.3215	19 39 1.5	12.714
14	7 22 57.02	2.5427	27 3 26.1	5.738	14	9 19 58.10	2.3163	19 26 15.1	12.830
15	7 25 29.49	2.5395	26 57 36.6	5.912	15	9 22 16.92	2.3112	19 13 21.9	12.944
16	7 28 1.76	2.5362	26 51 36.7	6.085	16	9 24 35.44	2.3060	19 0 21.9	13.057
17	7 30 33.84	2.5329	26 45 26.4	6.257	17	9 26 53.64	2.3008	18 47 15.1	13.169
18	7 33 5.71	2.5294	26 39 5.8	6.428	18	9 29 11.54	2.2957	18 34 1.6	13.279
19	7 35 37.37	2.5258	26 32 35.0	6.599	19	9 31 29.13	2.2907	18 20 41.6	13.388
20	7 38 8.81	2.5221	26 25 53.9	6.769	20	9 33 46.42	2.2857	18 7 15.1	13.495
21	7 40 40.02	2.5183	26 19 2.7	6.938	21	9 36 3.41	2.2807	17 53 42.2	13.600
22	7 43 11.01	2.5145	26 12 1.4	7.106	22	9 38 20.10	2.2757	17 40 3.1	13.703
23	7 45 41.76	2.5106	26 4 50.0	7.273	23	9 40 36.49	2.2708	17 26 17.8	13.807
24	7 48 12.28	2.5066	N.25 57 28.6	7.439	24	9 42 52.59	2.2659	N.17 12 26.3	13.908

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 17.					MONDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	13 8 28.60	2.1449	S. 8 55 36.9	16.367	0	14 55 39.31	2.3360	S. 20 33 35.1	12.102
1	13 10 37.38	2.1477	9 11 57.4	16.316	1	14 57 59.61	2.3406	20 45 37.4	11.975
2	13 12 46.32	2.1505	9 28 14.8	16.263	2	15 0 20.18	2.3451	20 57 32.1	11.847
3	13 14 55.44	2.1534	9 44 29.0	16.209	3	15 2 41.02	2.3497	21 9 19.0	11.717
4	13 17 4.73	2.1563	10 0 39.9	16.154	4	15 5 2.14	2.3542	21 20 58.1	11.585
5	13 19 14.20	2.1594	10 16 47.5	16.097	5	15 7 23.52	2.3586	21 32 29.2	11.452
6	13 21 23.86	2.1626	10 32 51.5	16.037	6	15 9 45.17	2.3631	21 43 52.4	11.319
7	13 23 33.71	2.1658	10 48 51.9	15.977	7	15 12 7.09	2.3675	21 55 7.5	11.184
8	13 25 43.75	2.1690	11 4 48.6	15.914	8	15 14 29.27	2.3718	22 6 14.5	11.047
9	13 27 53.99	2.1723	11 20 41.6	15.850	9	15 16 51.71	2.3763	22 17 13.3	10.910
10	13 30 4.43	2.1757	11 36 30.7	15.785	10	15 19 14.42	2.3807	22 28 3.7	10.771
11	13 32 15.07	2.1792	11 52 15.8	15.717	11	15 21 37.39	2.3849	22 38 45.7	10.630
12	13 34 25.93	2.1827	12 7 56.8	15.648	12	15 24 0.61	2.3891	22 49 19.3	10.488
13	13 36 37.00	2.1862	12 23 33.6	15.578	13	15 26 24.08	2.3933	22 59 44.4	10.346
14	13 38 48.28	2.1898	12 39 6.1	15.506	14	15 28 47.81	2.3976	23 10 0.8	10.202
15	13 40 59.78	2.1935	12 54 34.3	15.432	15	15 31 11.79	2.4017	23 20 8.5	10.056
16	13 43 11.50	2.1973	13 9 58.0	15.357	16	15 33 36.01	2.4057	23 30 7.5	9.910
17	13 45 23.45	2.2011	13 25 17.1	15.279	17	15 36 0.48	2.4097	23 39 57.7	9.762
18	13 47 35.63	2.2049	13 40 31.5	15.201	18	15 38 25.18	2.4137	23 49 38.9	9.613
19	13 49 48.04	2.2088	13 55 41.2	15.121	19	15 40 50.12	2.4176	23 59 11.2	9.463
20	13 52 0.69	2.2128	14 10 46.0	15.038	20	15 43 15.29	2.4214	24 8 34.5	9.312
21	13 54 13.57	2.2168	14 25 45.8	14.955	21	15 45 40.69	2.4252	24 17 48.7	9.160
22	13 56 26.70	2.2208	14 40 40.6	14.870	22	15 48 6.31	2.4288	24 26 53.7	9.007
23	13 58 40.07	2.2248	S. 14 55 30.2	14.783	23	15 50 32.15	2.4325	S. 24 35 49.5	8.852
SUNDAY 18.					TUESDAY 20.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	14 0 53.68	2.2289	S. 15 10 14.6	14.695	0	15 52 58.21	2.4361	S. 24 44 36.0	8.697
1	14 3 7.54	2.2332	15 24 53.6	14.605	1	15 55 24.48	2.4395	24 53 13.2	8.541
2	14 5 21.66	2.2374	15 39 27.2	14.513	2	15 57 50.95	2.4429	25 1 40.9	8.383
3	14 7 36.03	2.2416	15 53 55.2	14.420	3	16 0 17.63	2.4462	25 9 59.2	8.226
4	14 9 50.65	2.2459	16 8 17.6	14.325	4	16 2 44.50	2.4494	25 18 8.0	8.067
5	14 12 5.54	2.2502	16 22 34.2	14.228	5	16 5 11.56	2.4526	25 26 7.2	7.906
6	14 14 20.68	2.2546	16 36 45.0	14.131	6	16 7 38.81	2.4557	25 33 56.7	7.745
7	14 16 36.09	2.2590	16 50 49.9	14.031	7	16 10 6.24	2.4586	25 41 36.6	7.584
8	14 18 51.76	2.2634	17 4 48.7	13.929	8	16 12 33.84	2.4614	25 49 6.8	7.422
9	14 21 7.70	2.2678	17 18 41.4	13.827	9	16 15 1.61	2.4642	25 56 27.2	7.258
10	14 23 23.90	2.2722	17 32 28.0	13.723	10	16 17 29.55	2.4669	26 3 37.8	7.094
11	14 25 40.37	2.2767	17 46 8.2	13.617	11	16 19 57.64	2.4694	26 10 38.5	6.929
12	14 27 57.11	2.2812	17 59 42.0	13.509	12	16 22 25.88	2.4719	26 17 29.3	6.764
13	14 30 14.12	2.2857	18 13 9.3	13.401	13	16 24 54.27	2.4743	26 24 10.2	6.598
14	14 32 31.40	2.2903	18 26 30.1	13.291	14	16 27 22.79	2.4765	26 30 41.0	6.431
15	14 34 48.96	2.2949	18 39 44.2	13.178	15	16 29 51.45	2.4787	26 37 1.9	6.264
16	14 37 6.79	2.2995	18 52 51.5	13.064	16	16 32 20.23	2.4806	26 43 12.7	6.096
17	14 39 24.90	2.3041	19 5 51.9	12.948	17	16 34 49.12	2.4825	26 49 13.4	5.927
18	14 41 43.28	2.3086	19 18 45.3	12.832	18	16 37 18.13	2.4843	26 55 4.0	5.758
19	14 44 1.93	2.3132	19 31 31.7	12.714	19	16 39 47.24	2.4860	27 0 44.4	5.589
20	14 46 20.86	2.3177	19 44 11.0	12.595	20	16 42 16.45	2.4876	27 6 14.7	5.419
21	14 48 40.06	2.3223	19 56 43.1	12.474	21	16 44 45.75	2.4890	27 11 34.7	5.248
22	14 50 59.54	2.3269	20 9 7.9	12.351	22	16 47 15.13	2.4903	27 16 44.5	5.078
23	14 53 19.29	2.3314	20 21 25.2	12.227	23	16 49 44.59	2.4915	27 21 44.1	4.907
24	14 55 39.31	2.3360	S. 20 33 35.1	12.102	24	16 52 14.11	2.4925	S. 27 26 33.4	4.736

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 25.					TUESDAY 27.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	20 38 28.54	2.0958	S. 22 46 35.6	9.234	0	22 12 32.33	1.8443	S. 13 52 43.2	12.635
1	20 40 34.10	2.0895	22 37 18.7	9.329	1	22 14 22.88	1.8406	13 40 3.6	12.683
2	20 42 39.28	2.0832	22 27 56.1	9.423	2	22 16 13.20	1.8369	13 27 21.2	12.731
3	20 44 44.08	2.0769	22 18 27.9	9.517	3	22 18 3.31	1.8333	13 14 35.9	12.778
4	20 46 48.51	2.0707	22 8 54.1	9.608	4	22 19 53.20	1.8298	13 1 47.8	12.824
5	20 48 52.56	2.0644	21 59 14.9	9.699	5	22 21 42.88	1.8263	12 48 57.0	12.869
6	20 50 56.24	2.0582	21 49 30.2	9.789	6	22 23 32.36	1.8229	12 36 3.5	12.914
7	20 52 59.55	2.0522	21 39 40.2	9.877	7	22 25 21.63	1.8195	12 23 7.3	12.958
8	20 55 2.50	2.0461	21 29 45.0	9.963	8	22 27 10.70	1.8163	12 10 8.5	13.002
9	20 57 5.08	2.0400	21 19 44.6	10.050	9	22 28 59.59	1.8132	11 57 7.1	13.044
10	20 59 7.30	2.0339	21 9 39.0	10.135	10	22 30 48.29	1.8101	11 44 3.2	13.085
11	21 1 9.15	2.0279	20 59 28.4	10.219	11	22 32 36.80	1.8070	11 30 56.9	13.126
12	21 3 10.65	2.0221	20 49 12.7	10.302	12	22 34 25.13	1.8041	11 17 48.1	13.166
13	21 5 11.80	2.0162	20 38 52.1	10.384	13	22 36 13.29	1.8012	11 4 37.0	13.205
14	21 7 12.59	2.0103	20 28 26.6	10.465	14	22 38 1.27	1.7983	10 51 23.5	13.244
15	21 9 13.03	2.0044	20 17 56.3	10.544	15	22 39 49.09	1.7957	10 38 7.7	13.282
16	21 11 13.12	1.9987	20 7 21.3	10.623	16	22 41 36.75	1.7930	10 24 49.6	13.320
17	21 13 12.87	1.9930	19 56 41.5	10.702	17	22 43 24.25	1.7904	10 11 29.3	13.356
18	21 15 12.28	1.9873	19 45 57.1	10.778	18	22 45 11.60	1.7879	9 58 6.9	13.391
19	21 17 11.35	1.9817	19 35 8.2	10.853	19	22 46 58.80	1.7854	9 44 42.4	13.427
20	21 19 10.08	1.9761	19 24 14.8	10.928	20	22 48 45.85	1.7830	9 31 15.7	13.462
21	21 21 8.48	1.9706	19 13 16.9	11.002	21	22 50 32.76	1.7808	9 17 47.0	13.495
22	21 23 6.55	1.9651	19 2 14.6	11.074	22	22 52 19.54	1.7786	9 4 16.3	13.528
23	21 25 4.29	1.9597	S. 18 51 8.0	11.146	23	22 54 6.19	1.7765	S. 8 50 43.6	13.561
MONDAY 26.					WEDNESDAY 28.				
0	21 27 1.71	1.9543	S. 18 39 57.1	11.217	0	22 55 52.72	1.7744	S. 8 37 9.0	13.598
1	21 28 58.81	1.9491	18 28 42.0	11.286	1	22 57 39.12	1.7724	8 23 32.5	13.623
2	21 30 55.60	1.9438	18 17 22.8	11.354	2	22 59 25.41	1.7706	8 9 54.2	13.653
3	21 32 52.07	1.9386	18 5 59.5	11.422	3	23 1 11.59	1.7687	7 56 14.1	13.683
4	21 34 48.23	1.9335	17 54 32.2	11.488	4	23 2 57.66	1.7669	7 42 32.3	13.712
5	21 36 44.09	1.9285	17 43 0.9	11.554	5	23 4 43.62	1.7652	7 28 48.7	13.740
6	21 38 39.65	1.9235	17 31 25.7	11.619	6	23 6 29.49	1.7637	7 15 3.5	13.768
7	21 40 34.91	1.9185	17 19 46.6	11.683	7	23 8 15.26	1.7622	7 1 16.6	13.795
8	21 42 29.87	1.9136	17 8 3.7	11.746	8	23 10 0.95	1.7607	6 47 28.1	13.821
9	21 44 24.54	1.9088	16 56 17.1	11.808	9	23 11 46.55	1.7593	6 33 38.1	13.847
10	21 46 18.93	1.9041	16 44 26.7	11.870	10	23 13 32.07	1.7581	6 19 46.5	13.872
11	21 48 13.03	1.8993	16 32 32.7	11.929	11	23 15 17.52	1.7569	6 5 53.5	13.896
12	21 50 6.85	1.8947	16 20 35.2	11.988	12	23 17 2.90	1.7558	5 51 59.0	13.920
13	21 52 0.39	1.8902	16 8 34.1	12.047	13	23 18 48.21	1.7547	5 38 3.1	13.943
14	21 53 53.67	1.8858	15 56 29.5	12.105	14	23 20 33.46	1.7537	5 24 5.9	13.965
15	21 55 46.68	1.8813	15 44 21.5	12.162	15	23 22 18.66	1.7528	5 10 7.3	13.987
16	21 57 39.42	1.8768	15 32 10.1	12.218	16	23 24 3.80	1.7520	4 56 7.5	14.008
17	21 59 31.90	1.8726	15 19 55.3	12.273	17	23 25 48.90	1.7513	4 42 6.4	14.028
18	22 1 24.13	1.8683	15 7 37.3	12.327	18	23 27 33.95	1.7506	4 28 4.1	14.048
19	22 3 16.10	1.8642	14 55 16.1	12.380	19	23 29 18.97	1.7500	4 14 0.6	14.067
20	22 5 7.83	1.8601	14 42 51.7	12.433	20	23 31 3.95	1.7494	3 59 56.0	14.086
21	22 6 59.31	1.8560	14 30 24.1	12.485	21	23 32 48.90	1.7490	3 45 50.3	14.103
22	22 8 50.55	1.8521	14 17 53.5	12.536	22	23 34 33.83	1.7487	3 31 43.6	14.120
23	22 10 41.56	1.8482	14 5 19.8	12.586	23	23 36 18.74	1.7484	3 17 35.9	14.137
24	22 12 32.33	1.8443	S. 13 52 43.2	12.635	24	23 38 3.64	1.7482	S. 3 3 27.2	14.153

GREENWICH MEAN TIME.**THE MOON'S RIGHT ASCENSION AND DECLINATION.**

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from					
		Apparent Right Ascension.			Diff. for 1 Hour.	Apparent Declination.			Diff. for 1 Hour.	Semidiameter.	Added to Apparent Time.			
		h	m	s	s	°	'	"	"	'	"	s	m	s
SUN.	1	4	34	58.59	10.229	N.22	0	52.7	+20.74	15	47.94	68.36	2	28.08
Mon.	2	4	39	4.30	10.246	22	8	59.1	19.78	15	47.80	68.41	2	18.95
Tues.	3	4	43	10.41	10.262	22	16	42.3	18.81	15	47.67	68.47	2	9.42
Wed.	4	4	47	16.90	10.277	22	24	2.2	+17.83	15	47.54	68.52	1	59.51
Thur.	5	4	51	23.75	10.292	22	30	58.6	16.85	15	47.41	68.57	1	49.25
Fri.	6	4	55	30.94	10.306	22	37	31.2	15.86	15	47.29	68.62	1	38.65
Sat.	7	4	59	38.44	10.318	22	43	40.0	+14.87	15	47.18	68.66	1	27.74
SUN.	8	5	3	46.22	10.330	22	49	24.9	13.87	15	47.07	68.70	1	16.54
Mon.	9	5	7	54.26	10.340	22	54	45.7	12.86	15	46.97	68.74	1	5.08
Tues.	10	5	12	2.55	10.350	22	59	42.3	+11.85	15	46.87	68.77	0	53.39
Wed.	11	5	16	11.06	10.359	23	4	14.5	10.83	15	46.78	68.80	0	41.48
Thur.	12	5	20	19.76	10.366	23	8	22.3	9.81	15	46.69	68.83	0	29.37
Fri.	13	5	24	28.63	10.372	23	12	5.7	+ 8.79	15	46.60	68.86	0	17.09
Sat.	14	5	28	37.65	10.378	23	15	24.6	7.77	15	46.52	68.88	0	4.66
SUN.	15	5	32	46.80	10.384	23	18	18.9	6.75	15	46.44	68.90	0	7.90
Mon.	16	5	36	56.07	10.388	23	20	48.5	+ 5.72	15	46.36	68.92	0	20.57
Tues.	17	5	41	5.43	10.391	23	22	53.4	4.69	15	46.29	68.93	0	33.33
Wed.	18	5	45	14.86	10.394	23	24	33.7	3.66	15	46.22	68.94	0	46.17
Thur.	19	5	49	24.35	10.396	23	25	49.3	+ 2.63	15	46.15	68.94	0	59.07
Fri.	20	5	53	33.88	10.397	23	26	40.1	1.60	15	46.09	68.94	1	12.00
Sat.	21	5	57	43.42	10.397	23	27	6.1	+ 0.57	15	46.04	68.94	1	24.94
SUN.	22	6	1	52.95	10.396	23	27	7.4	- 0.46	15	45.98	68.94	1	37.88
Mon.	23	6	6	2.46	10.395	23	26	43.9	1.50	15	45.93	68.94	1	50.80
Tues.	24	6	10	11.92	10.393	23	25	55.6	2.53	15	45.88	68.93	2	3.67
Wed.	25	6	14	21.31	10.389	23	24	42.5	- 3.56	15	45.83	68.92	2	16.47
Thur.	26	6	18	30.62	10.385	23	23	4.7	4.59	15	45.79	68.90	2	29.18
Fri.	27	6	22	39.82	10.380	23	21	2.2	5.61	15	45.76	68.88	2	41.78
Sat.	28	6	26	48.87	10.373	23	18	35.1	- 6.64	15	45.73	68.85	2	54.24
SUN.	29	6	30	57.76	10.366	23	15	43.5	7.67	15	45.70	68.82	3	6.54
Mon.	30	6	35	6.47	10.359	23	12	27.3	8.69	15	45.68	68.79	3	18.66
Tues.	31	6	39	14.97	10.350	N.23	8	46.6	- 9.71	15	45.66	68.76	3	30.57

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.19 from sidereal time.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing the sign - indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Added to	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Subtracted from Mean Time.		
		h m s	s	° ' "	"	m s	s	h m s
SUN.	1	4 34 59.01	10.228	N.22 0 53.6	+20.74	2 28.05	0.371	4 37 27.06
Mon.	2	4 39 4.69	10.245	22 8 59.9	19.78	2 18.93	0.389	4 41 23.62
Tues.	3	4 43 10.77	10.261	22 16 43.0	18.81	2 9.41	0.405	4 45 20.18
Wed.	4	4 47 17.24	10.276	22 24 2.8	+17.83	1 59.50	0.420	4 49 16.74
Thur.	5	4 51 24.06	10.291	22 30 59.0	16.85	1 49.24	0.435	4 53 13.30
Fri.	6	4 55 31.22	10.305	22 37 31.6	15.86	1 38.64	0.448	4 57 9.86
Sat.	7	4 59 38.69	10.317	22 43 40.4	+14.86	1 27.73	0.461	5 1 6.41
SUN.	8	5 3 46.44	10.328	22 49 25.2	13.86	1 16.53	0.472	5 5 2.97
Mon.	9	5 7 54.45	10.339	22 54 45.9	12.86	1 5.07	0.482	5 8 59.53
Tues.	10	5 12 2.71	10.348	22 59 42.4	+11.85	0 53.38	0.492	5 12 56.09
Wed.	11	5 16 11.18	10.357	23 4 14.6	10.84	0 41.47	0.500	5 16 52.65
Thur.	12	5 20 19.84	10.364	23 8 22.4	9.82	0 29.37	0.508	5 20 49.21
Fri.	13	5 24 28.68	10.371	23 12 5.8	+ 8.80	0 17.09	0.515	5 24 45.76
Sat.	14	5 28 37.66	10.377	23 15 24.6	7.78	0 4.66	0.521	5 28 42.32
SUN.	15	5 32 46.78	10.383	23 18 18.9	6.75	0 7.90	0.526	5 32 38.88
Mon.	16	5 36 56.01	10.387	23 20 48.5	+ 5.72	0 20.57	0.530	5 36 35.44
Tues.	17	5 41 5.33	10.390	23 22 53.5	4.69	0 33.33	0.533	5 40 32.00
Wed.	18	5 45 14.73	10.393	23 24 33.8	3.66	0 46.17	0.536	5 44 28.56
Thur.	19	5 49 24.18	10.395	23 25 49.3	+ 2.63	0 59.06	0.538	5 48 25.12
Fri.	20	5 53 33.66	10.396	23 26 40.1	1.60	1 11.99	0.539	5 52 21.68
Sat.	21	5 57 43.17	10.396	23 27 6.1	+ 0.57	1 24.93	0.539	5 56 18.24
SUN.	22	6 1 52.67	10.395	23 27 7.4	− 0.46	1 37.87	0.539	6 0 14.79
Mon.	23	6 6 2.14	10.393	23 26 43.9	1.50	1 50.78	0.537	6 4 11.35
Tues.	24	6 10 11.56	10.391	23 25 55.6	2.53	2 3.65	0.535	6 8 7.91
Wed.	25	6 14 20.92	10.388	23 24 42.6	− 3.56	2 16.45	0.531	6 12 4.47
Thur.	26	6 18 30.19	10.384	23 23 4.9	4.59	2 29.16	0.527	6 16 1.03
Fri.	27	6 22 39.34	10.379	23 21 2.5	5.61	2 41.76	0.522	6 19 57.59
Sat.	28	6 26 48.36	10.372	23 18 35.5	− 6.64	2 54.22	0.516	6 23 54.14
SUN.	29	6 30 57.22	10.365	23 15 43.9	7.66	3 6.52	0.509	6 27 50.70
Mon.	30	6 35 5.89	10.357	23 12 27.8	8.68	3 18.63	0.500	6 31 47.26
Tues.	31	6 39 14.36	10.348	N.23 8 47.2	− 9.70	3 30.53	0.491	6 35 43.82

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign − indicates that north declinations are decreasing.

Diff. for 1 Hour.
+9°.8565.
(Table III.)

AT GREENWICH MEAN NOON.													
Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.			
		True Longitude.			Diff. for 1 Hour.	Latitude.							
		λ	λ'										
		°	'	"	'	"	"	"		h	m	s	
1	152	70	22	3.9	21	43.7	143.74	+0.14	0.006 1677	+27.1	19	19	22.48
2	153	71	19	33.3	19	12.9	143.70	0.24	0.006 2317	26.2	19	15	26.57
3	154	72	17	1.8	16	41.2	143.67	0.32	0.006 2934	25.2	19	11	30.66
4	155	73	14	29.4	14	8.7	143.63	+0.37	0.006 3527	+24.2	19	7	34.74
5	156	74	11	56.1	11	35.2	143.59	0.39	0.006 4096	23.2	19	3	38.83
6	157	75	9	21.9	9	0.8	143.55	0.39	0.006 4640	22.2	18	59	42.92
7	158	76	6	46.8	6	25.5	143.51	+0.35	0.006 5160	+21.2	18	55	47.01
8	159	77	4	10.7	3	49.2	143.47	0.28	0.006 5656	20.2	18	51	51.09
9	160	78	1	33.5	1	11.8	143.43	0.18	0.006 6128	19.3	18	47	55.18
10	161	78	58	55.2	58	33.3	143.39	+0.06	0.006 6580	+18.4	18	43	59.27
11	162	79	56	15.9	55	53.8	143.34	−0.06	0.006 7010	17.6	18	40	3.36
12	163	80	53	35.6	53	13.4	143.30	0.18	0.006 7421	16.8	18	36	7.44
13	164	81	50	54.3	50	31.9	143.26	−0.32	0.006 7813	+16.1	18	32	11.53
14	165	82	48	12.1	47	49.5	143.22	0.45	0.006 8189	15.4	18	28	15.62
15	166	83	45	29.0	45	6.2	143.19	0.56	0.006 8549	14.7	18	24	19.71
16	167	84	42	45.2	42	22.1	143.16	−0.64	0.006 8894	+14.1	18	20	23.79
17	168	85	40	0.6	39	37.4	143.13	0.70	0.006 9225	13.5	18	16	27.88
18	169	86	37	15.4	36	52.0	143.11	0.74	0.006 9543	12.9	18	12	31.97
19	170	87	34	29.7	34	6.1	143.09	−0.74	0.006 9847	+12.3	18	8	36.05
20	171	88	31	43.6	31	19.8	143.08	0.71	0.007 0136	11.7	18	4	40.14
21	172	89	28	57.2	28	33.2	143.07	0.66	0.007 0410	11.1	18	0	44.23
22	173	90	26	10.5	25	46.3	143.06	−0.60	0.007 0669	+10.5	17	56	48.31
23	174	91	23	23.7	22	59.3	143.05	0.51	0.007 0912	9.8	17	52	52.40
24	175	92	20	36.7	20	12.1	143.04	0.41	0.007 1138	9.0	17	48	56.49
25	176	93	17	49.6	17	24.8	143.04	−0.29	0.007 1345	+ 8.2	17	45	0.58
26	177	94	15	2.5	14	37.6	143.04	0.17	0.007 1534	7.4	17	41	4.66
27	178	95	12	15.5	11	50.3	143.04	−0.05	0.007 1703	6.6	17	37	8.75
28	179	96	9	28.5	9	3.1	143.04	+0.06	0.007 1850	+ 5.7	17	33	12.84
29	180	97	6	41.5	6	16.0	143.05	0.17	0.007 1976	4.7	17	29	16.93
30	181	98	3	54.7	3	29.0	143.05	0.25	0.007 2079	3.7	17	25	21.01
31	182	99	1	8.0	0	42.0	143.05	+0.29	0.007 2157	+ 2.7	17	21	25.10
NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.										Diff. for 1 Hour. −9 ^s .8296. (Table II.)			

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' ''	' ''	' ''	''	' ''	''	h m	m	d
1	15 10.7	15 15.6	55 36.44	+1.455	55 54.44	+1.542	21 51.4	1.98	26.1
2	15 20.7	15 26.1	56 13.34	1.602	56 32.77	1.631	22 41.3	2.18	27.1
3	15 31.4	15 36.7	56 52.36	1.630	57 11.78	1.602	23 36.1	2.38	28.1
4	15 41.8	15 46.8	57 30.69	+1.546	57 48.76	+1.462	0	.	29.1
5	15 51.4	15 55.6	58 5.70	1.357	58 21.26	1.231	0 35.1	2.52	0.7
6	15 59.4	16 2.7	58 35.21	1.091	58 47.41	0.941	1 36.5	2.57	1.7
7	16 5.6	16 7.9	58 57.76	+0.785	59 6.24	+0.628	2 37.7	2.50	2.7
8	16 9.7	16 11.0	59 12.85	0.473	59 17.63	0.325	3 36.2	2.36	3.7
9	16 11.8	16 12.2	59 20.68	+0.185	59 22.09	+0.052	4 30.8	2.20	4.7
10	16 12.2	16 11.7	59 21.96	−0.071	59 20.40	−0.185	5 21.9	2.06	5.7
11	16 10.9	16 9.8	59 17.54	0.289	59 13.47	0.388	6 10.3	1.98	6.7
12	16 8.4	16 6.7	59 8.24	0.482	59 1.89	0.574	6 57.6	1.97	7.7
13	16 4.7	16 2.4	58 54.47	−0.662	58 45.99	−0.750	7 45.1	2.00	8.7
14	15 59.8	15 56.9	58 36.46	0.838	58 25.88	0.925	8 34.2	2.10	9.7
15	15 53.7	15 50.3	58 14.27	1.009	58 1.65	1.093	9 25.9	2.21	10.7
16	15 46.6	15 42.6	57 48.06	−1.171	57 33.57	−1.243	10 20.4	2.33	11.7
17	15 38.5	15 34.1	57 18.30	1.301	57 2.39	1.348	11 17.3	2.40	12.7
18	15 29.7	15 25.1	56 45.99	1.382	56 29.29	1.397	12 14.9	2.38	13.7
19	15 20.5	15 16.0	56 12.52	−1.393	55 55.94	−1.368	13 11.1	2.29	14.7
20	15 11.6	15 7.4	55 39.78	1.322	55 24.30	1.255	14 4.2	2.13	15.7
21	15 3.4	14 59.8	55 9.76	1.164	54 56.43	1.054	14 53.4	1.96	16.7
22	14 56.5	14 53.8	54 44.53	−0.925	54 34.29	−0.779	15 38.6	1.81	17.7
23	14 51.5	14 49.8	54 25.91	0.616	54 19.60	0.434	16 20.7	1.70	18.7
24	14 48.6	14 48.2	54 15.54	−0.242	54 13.83	−0.043	17 0.6	1.64	19.7
25	14 48.4	14 49.3	54 14.54	+0.162	54 17.76	+0.375	17 39.6	1.62	20.7
26	14 50.8	14 53.1	54 23.55	0.589	54 31.91	0.803	18 18.7	1.65	21.7
27	14 56.1	14 59.7	54 42.79	1.010	54 56.09	1.206	18 59.4	1.74	22.7
28	15 4.0	15 8.8	55 11.68	+1.390	55 29.39	+1.558	19 42.8	1.88	23.7
29	15 14.1	15 19.9	55 49.00	1.706	56 10.23	1.827	20 30.2	2.08	24.7
30	15 26.0	15 32.4	56 32.72	1.917	56 56.11	1.976	21 22.6	2.29	25.7
31	15 38.9	15 45.4	57 19.98	1.997	57 43.87	1.978	22 20.0	2.48	26.7
32	15 51.8	15 57.9	58 7.26	+1.913	58 29.64	+1.809	23 21.4	2.60	27.7

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 5.					SATURDAY 7.				
	^h ^m ^s	^s	[°] ['] ["]	["]		^h ^m ^s	^s	[°] ['] ["]	["]
0	5 26 56.63	2.5874	N.28 13 30.0	2.356	0	7 32 27.64	2.5779	N.26 30 34.2	6.605
1	5 29 31.99	2.5912	28 15 45.9	2.174	1	7 35 2.19	2.5738	26 23 52.6	6.782
2	5 32 7.57	2.5947	28 17 50.9	1.992	2	7 37 36.50	2.5697	26 17 0.4	6.957
3	5 34 43.36	2.5982	28 19 44.9	1.808	3	7 40 10.55	2.5654	26 9 57.8	7.130
4	5 37 19.35	2.6015	28 21 27.8	1.623	4	7 42 44.35	2.5611	26 2 44.8	7.303
5	5 39 55.54	2.6047	28 22 59.7	1.439	5	7 45 17.88	2.5565	25 55 21.4	7.475
6	5 42 31.91	2.6077	28 24 20.5	1.254	6	7 47 51.13	2.5519	25 47 47.8	7.645
7	5 45 8.46	2.6105	28 25 30.2	1.068	7	7 50 24.11	2.5473	25 40 4.0	7.815
8	5 47 45.17	2.6131	28 26 28.7	0.882	8	7 52 56.81	2.5425	25 32 10.0	7.983
9	5 50 22.03	2.6155	28 27 16.0	0.694	9	7 55 29.21	2.5375	25 24 6.0	8.150
10	5 52 59.03	2.6178	28 27 52.0	0.507	10	7 58 1.31	2.5326	25 15 52.0	8.315
11	5 55 36.17	2.6200	28 28 16.8	0.318	11	8 0 33.12	2.5276	25 7 28.2	8.479
12	5 58 13.43	2.6219	28 28 30.2	+0.129	12	8 3 4.62	2.5223	24 58 54.5	8.642
13	6 0 50.80	2.6237	28 28 32.3	-0.060	13	8 5 35.80	2.5171	24 50 11.1	8.804
14	6 3 28.27	2.6253	28 28 23.0	0.250	14	8 8 6.67	2.5118	24 41 18.0	8.964
15	6 6 5.83	2.6267	28 28 2.3	0.439	15	8 10 37.22	2.5064	24 32 15.4	9.122
16	6 8 43.47	2.6279	28 27 30.3	0.629	16	8 13 7.44	2.5009	24 23 3.3	9.279
17	6 11 21.18	2.6290	28 26 46.8	0.820	17	8 15 37.33	2.4955	24 13 41.9	9.435
18	6 13 58.95	2.6298	28 25 51.9	1.010	18	8 18 6.90	2.4899	24 4 11.1	9.590
19	6 16 36.76	2.6305	28 24 45.6	1.201	19	8 20 36.12	2.4842	23 54 31.1	9.743
20	6 19 14.61	2.6311	28 23 27.9	1.391	20	8 23 5.00	2.4785	23 44 41.9	9.895
21	6 21 52.49	2.6314	28 21 58.7	1.582	21	8 25 33.54	2.4727	23 34 43.7	10.044
22	6 24 30.38	2.6316	28 20 18.0	1.773	22	8 28 1.73	2.4670	23 24 36.6	10.192
23	6 27 8.28	2.6316	N.28 18 25.9	1.963	23	8 30 29.58	2.4612	N.23 14 20.6	10.340
FRIDAY 6.					SUNDAY 8.				
0	6 29 46.17	2.6314	N.28 16 22.4	2.154	0	8 32 57.07	2.4552	N.23 3 55.8	10.485
1	6 32 24.05	2.6311	28 14 7.4	2.345	1	8 35 24.21	2.4493	22 53 22.4	10.628
2	6 35 1.90	2.6305	28 11 41.0	2.535	2	8 37 50.99	2.4433	22 42 40.4	10.771
3	6 37 39.71	2.6298	28 9 3.2	2.726	3	8 40 17.41	2.4373	22 31 49.9	10.912
4	6 40 17.47	2.6289	28 6 13.9	2.916	4	8 42 43.47	2.4313	22 20 51.0	11.051
5	6 42 55.18	2.6279	28 3 13.3	3.105	5	8 45 9.17	2.4253	22 9 43.8	11.187
6	6 45 32.82	2.6267	28 0 1.3	3.295	6	8 47 34.51	2.4192	21 58 28.5	11.323
7	6 48 10.38	2.6253	27 56 37.9	3.484	7	8 49 59.48	2.4132	21 47 5.0	11.458
8	6 50 47.85	2.6237	27 53 3.2	3.672	8	8 52 24.09	2.4071	21 35 33.5	11.591
9	6 53 25.22	2.6220	27 49 17.2	3.861	9	8 54 48.33	2.4010	21 23 54.1	11.721
10	6 56 2.49	2.6202	27 45 19.9	4.048	10	8 57 12.21	2.3949	21 12 7.0	11.850
11	6 58 39.64	2.6181	27 41 11.4	4.236	11	8 59 35.72	2.3888	21 0 12.1	11.978
12	7 1 16.66	2.6158	27 36 51.6	4.422	12	9 1 58.87	2.3828	20 48 9.6	12.103
13	7 3 53.54	2.6135	27 32 20.7	4.608	13	9 4 21.65	2.3766	20 35 59.7	12.227
14	7 6 30.28	2.6110	27 27 38.6	4.794	14	9 6 44.06	2.3705	20 23 42.3	12.350
15	7 9 6.86	2.6082	27 22 45.4	4.979	15	9 9 6.11	2.3644	20 11 17.7	12.471
16	7 11 43.27	2.6054	27 17 41.1	5.163	16	9 11 27.79	2.3583	19 58 45.8	12.591
17	7 14 19.51	2.6025	27 12 25.8	5.347	17	9 13 49.11	2.3523	19 46 6.8	12.708
18	7 16 55.57	2.5994	27 6 59.5	5.529	18	9 16 10.06	2.3462	19 33 20.8	12.823
19	7 19 31.44	2.5962	27 1 22.3	5.711	19	9 18 30.65	2.3402	19 20 28.0	12.937
20	7 22 7.11	2.5928	26 55 34.2	5.892	20	9 20 50.88	2.3342	19 7 28.4	13.049
21	7 24 42.57	2.5892	26 49 35.3	6.072	21	9 23 10.75	2.3282	18 54 22.1	13.160
22	7 27 17.82	2.5856	26 43 25.6	6.251	22	9 25 30.26	2.3222	18 41 9.2	13.269
23	7 29 52.84	2.5818	26 37 5.2	6.428	23	9 27 49.42	2.3163	18 27 49.8	13.377
24	7 32 27.64	2.5779	N.26 30 34.2	6.605	24	9 30 8.22	2.3104	N.18 14 24.0	13.482

JUNE, 1913.**GREENWICH MEAN TIME.****THE MOON'S RIGHT ASCENSION AND DECLINATION.**

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

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GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 21.					MONDAY 23.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 20 37.70	2.1597	S. 23 49 34.9	8.530	0	21 57 18.91	1.8842	S. 15 19 7.2	12.316
1	20 22 47.09	2.1533	23 40 59.9	8.635	1	21 59 11.82	1.8797	15 6 46.6	12.369
2	20 24 56.10	2.1469	23 32 18.7	8.739	2	22 1 4.47	1.8752	14 54 22.9	12.422
3	20 27 4.72	2.1405	23 23 31.2	8.843	3	22 2 56.85	1.8707	14 41 56.0	12.473
4	20 29 12.96	2.1342	23 14 37.5	8.946	4	22 4 48.96	1.8664	14 29 26.1	12.523
5	20 31 20.82	2.1277	23 5 37.7	9.047	5	22 6 40.82	1.8622	14 16 53.2	12.573
6	20 33 28.29	2.1213	22 56 31.9	9.147	6	22 8 32.42	1.8580	14 4 17.3	12.622
7	20 35 35.38	2.1150	22 47 20.1	9.246	7	22 10 23.78	1.8539	13 51 38.5	12.671
8	20 37 42.09	2.1087	22 38 2.4	9.343	8	22 12 14.89	1.8498	13 38 56.8	12.718
9	20 39 48.42	2.1023	22 28 38.9	9.439	9	22 14 5.76	1.8458	13 26 12.3	12.764
10	20 41 54.37	2.0960	22 19 9.7	9.533	10	22 15 56.39	1.8418	13 13 25.1	12.809
11	20 43 59.94	2.0897	22 9 34.9	9.627	11	22 17 46.78	1.8380	13 0 35.2	12.854
12	20 46 5.13	2.0833	21 59 54.4	9.721	12	22 19 36.95	1.8342	12 47 42.6	12.898
13	20 48 9.94	2.0772	21 50 8.4	9.812	13	22 21 26.89	1.8305	12 34 47.4	12.941
14	20 50 14.39	2.0710	21 40 17.0	9.902	14	22 23 16.61	1.8268	12 21 49.7	12.983
15	20 52 18.46	2.0647	21 30 20.2	9.991	15	22 25 6.11	1.8232	12 8 49.4	13.025
16	20 54 22.15	2.0585	21 20 18.1	10.079	16	22 26 55.40	1.8197	11 55 46.7	13.065
17	20 56 25.48	2.0524	21 10 10.7	10.166	17	22 28 44.48	1.8163	11 42 41.6	13.105
18	20 58 28.44	2.0463	20 59 58.1	10.252	18	22 30 33.36	1.8130	11 29 34.1	13.144
19	21 0 31.04	2.0402	20 49 40.5	10.335	19	22 32 22.04	1.8097	11 16 24.3	13.182
20	21 2 33.27	2.0342	20 39 17.9	10.418	20	22 34 10.52	1.8064	11 3 12.3	13.219
21	21 4 35.14	2.0282	20 28 50.3	10.501	21	22 35 58.81	1.8033	10 49 58.0	13.256
22	21 6 36.65	2.0222	20 18 17.8	10.582	22	22 37 46.92	1.8002	10 36 41.6	13.292
23	21 8 37.80	2.0162	S. 20 7 40.4	10.662	23	22 39 34.84	1.7972	S. 10 23 23.0	13.327
SUNDAY 22.					TUESDAY 24.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	21 10 38.60	2.0104	S. 19 56 58.3	10.741	0	22 41 22.59	1.7943	S. 10 10 2.4	13.361
1	21 12 39.05	2.0045	19 46 11.5	10.818	1	22 43 10.16	1.7915	9 56 39.7	13.394
2	21 14 39.14	1.9987	19 35 20.1	10.894	2	22 44 57.57	1.7887	9 43 15.0	13.427
3	21 16 38.89	1.9930	19 24 24.2	10.970	3	22 46 44.81	1.7860	9 29 48.4	13.460
4	21 18 38.30	1.9873	19 13 23.8	11.044	4	22 48 31.89	1.7833	9 16 19.9	13.491
5	21 20 37.37	1.9817	19 2 18.9	11.117	5	22 50 18.81	1.7807	9 2 49.6	13.521
6	21 22 36.10	1.9760	18 51 9.6	11.190	6	22 52 5.58	1.7782	8 49 17.4	13.551
7	21 24 34.49	1.9704	18 39 56.1	11.261	7	22 53 52.20	1.7759	8 35 43.4	13.581
8	21 26 32.55	1.9649	18 28 38.3	11.332	8	22 55 38.69	1.7737	8 22 7.7	13.608
9	21 28 30.28	1.9594	18 17 16.3	11.401	9	22 57 25.04	1.7713	8 8 30.4	13.636
10	21 30 27.68	1.9540	18 5 50.2	11.468	10	22 59 11.25	1.7692	7 54 51.4	13.663
11	21 32 24.76	1.9487	17 54 20.1	11.535	11	23 0 57.34	1.7671	7 41 10.8	13.690
12	21 34 21.52	1.9433	17 42 46.0	11.602	12	23 2 43.30	1.7650	7 27 28.6	13.716
13	21 36 17.96	1.9381	17 31 7.9	11.667	13	23 4 29.14	1.7631	7 13 44.9	13.740
14	21 38 14.09	1.9329	17 19 26.0	11.730	14	23 6 14.87	1.7612	6 59 59.8	13.764
15	21 40 9.91	1.9277	17 7 40.3	11.793	15	23 8 0.49	1.7594	6 46 13.2	13.788
16	21 42 5.42	1.9227	16 55 50.8	11.855	16	23 9 46.00	1.7577	6 32 25.2	13.811
17	21 44 0.63	1.9177	16 43 57.7	11.916	17	23 11 31.41	1.7561	6 18 35.9	13.833
18	21 45 55.54	1.9127	16 32 0.9	11.977	18	23 13 16.73	1.7545	6 4 45.2	13.855
19	21 47 50.15	1.9078	16 20 0.5	12.036	19	23 15 1.95	1.7530	5 50 53.3	13.875
20	21 49 44.48	1.9030	16 7 56.6	12.093	20	23 16 47.09	1.7516	5 37 0.2	13.896
21	21 51 38.51	1.8982	15 55 49.3	12.150	21	23 18 32.14	1.7502	5 23 5.8	13.916
22	21 53 32.26	1.8934	15 43 38.6	12.207	22	23 20 17.12	1.7490	5 9 10.3	13.934
23	21 55 25.72	1.8887	15 31 24.5	12.262	23	23 22 2.02	1.7478	4 55 13.7	13.952
24	21 57 18.91	1.8842	S. 15 19 7.2	12.316	24	23 23 46.86	1.7467	S. 4 41 16.0	13.970

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 29.					TUESDAY, JULY 1.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	2 18 31.39	2.0197	N.17 17 55.7	12.277	0	4 4 9.25	2.3927	N.25 28 47.5	7.580
1	2 20 32.78	2.0265	17 30 10.4	12.213	PHASES OF THE MOON.				
2	2 22 34.57	2.0332	17 42 21.3	12.149					
3	2 24 36.77	2.0402	17 54 28.3	12.083					
4	2 26 39.39	2.0471	18 6 31.3	12.016					
5	2 28 42.42	2.0541	18 18 30.2	11.948					
6	2 30 45.88	2.0612	18 30 25.0	11.878					
7	2 32 49.76	2.0682	18 42 15.5	11.806					
8	2 34 54.07	2.0754	18 54 1.7	11.734					
9	2 36 58.81	2.0827	19 5 43.6	11.661					
10	2 39 4.00	2.0901	19 17 21.0	11.585					
11	2 41 9.62	2.0974	19 28 53.8	11.508					
12	2 43 15.69	2.1048	19 40 21.9	11.429					
13	2 45 22.20	2.1122	19 51 45.3	11.350					
14	2 47 29.16	2.1198	20 3 3.9	11.269					
15	2 49 36.58	2.1275	20 14 17.6	11.187					
16	2 51 44.46	2.1351	20 25 26.3	11.103	<div><div>●</div>New Moon . . . June 4 7 57.0</div> <div><div>☾</div>First Quarter . . . 11 4 37.3</div> <div><div>○</div>Full Moon . . . 18 5 53.7</div> <div><div>☾</div>Last Quarter . . . 26 5 40.8</div>				
17	2 53 52.79	2.1427	20 36 29.9	11.017					
18	2 56 1.59	2.1505	20 47 28.3	10.929					
19	2 58 10.85	2.1582	20 58 21.4	10.841					
20	3 0 20.58	2.1661	21 9 9.2	10.752					
21	3 2 30.78	2.1739	21 19 51.6	10.660					
22	3 4 41.45	2.1817	21 30 28.4	10.567					
23	3 6 52.59	2.1897	N.21 40 59.6	10.472					
MONDAY 30.										☾ Perigee . . . June 9 16.5 ☾ Apogee . . . 24 14.7
0	3 9 4.21	2.1977	N.21 51 25.1	10.376					
1	3 11 16.31	2.2057	22 1 44.8	10.278					
2	3 13 28.89	2.2137	22 11 58.5	10.179					
3	3 15 41.96	2.2218	22 22 6.2	10.078					
4	3 17 55.51	2.2298	22 32 7.8	9.976					
5	3 20 9.54	2.2379	22 42 3.3	9.872					
6	3 22 24.06	2.2461	22 51 52.4	9.765					
7	3 24 39.07	2.2542	23 1 35.1	9.658					
8	3 26 54.57	2.2624	23 11 11.3	9.549					
9	3 29 10.56	2.2706	23 20 41.0	9.438					
10	3 31 27.04	2.2788	23 30 4.0	9.327					
11	3 33 44.02	2.2870	23 39 20.2	9.213					
12	3 36 1.48	2.2951	23 48 29.5	9.097					
13	3 38 19.43	2.3033	23 57 31.8	8.979					
14	3 40 37.88	2.3116	24 6 27.0	8.861					
15	3 42 56.82	2.3197	24 15 15.0	8.740					
16	3 45 16.25	2.3279	24 23 55.8	8.618					
17	3 47 36.17	2.3361	24 32 29.2	8.494					
18	3 49 56.58	2.3442	24 40 55.1	8.368					
19	3 52 17.48	2.3523	24 49 13.4	8.241					
20	3 54 38.86	2.3605	24 57 24.0	8.112					
21	3 57 0.73	2.3686	25 5 26.8	7.981					
22	3 59 23.09	2.3767	25 13 21.7	7.848					
23	4 1 45.93	2.3847	25 21 8.6	7.715					
24	4 4 9.25	2.3927	N.25 28 47.5	7.580					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.					
		Apparent Right Ascension.			Diff. for 1 Hour.	Apparent Declination.				Diff. for 1 Hour.	Semidiameter.			
		h	m	s	s	°	'	"	"	'	"	s	m	s
Tues.	1	6	39	14.97	10.350	N.23	8	46.6	- 9.71	15	45.66	68.76	3	30.57
Wed.	2	6	43	23.23	10.339	23	4	41.6	10.72	15	45.65	68.73	3	42.24
Thur.	3	6	47	31.23	10.328	23	0	12.3	11.72	15	45.64	68.69	3	53.65
Fri.	4	6	51	38.95	10.315	22	55	18.9	-12.72	15	45.64	68.65	4	4.78
Sat.	5	6	55	46.36	10.301	22	50	1.5	13.72	15	45.65	68.61	4	15.60
SUN.	6	6	59	53.43	10.286	22	44	20.2	14.71	15	45.66	68.56	4	26.09
Mon.	7	7	4	0.14	10.271	22	38	15.4	-15.70	15	45.67	68.51	4	36.21
Tues.	8	7	8	6.46	10.255	22	31	46.7	16.68	15	45.69	68.46	4	45.95
Wed.	9	7	12	12.38	10.238	22	24	54.7	17.65	15	45.72	68.40	4	55.28
Thur.	10	7	16	17.88	10.220	22	17	39.6	-18.61	15	45.76	68.34	5	4.19
Fri.	11	7	20	22.93	10.201	22	10	1.5	19.56	15	45.80	68.28	5	12.66
Sat.	12	7	24	27.52	10.182	22	2	0.5	20.51	15	45.84	68.22	5	20.67
SUN.	13	7	28	31.63	10.162	21	53	36.9	-21.45	15	45.88	68.16	5	28.21
Mon.	14	7	32	35.26	10.141	21	44	50.9	22.38	15	45.93	68.09	5	35.26
Tues.	15	7	36	38.39	10.120	21	35	42.7	23.30	15	45.99	68.02	5	41.81
Wed.	16	7	40	41.01	10.098	21	26	12.5	-24.21	15	46.05	67.95	5	47.86
Thur.	17	7	44	43.12	10.076	21	16	20.4	25.12	15	46.11	67.88	5	53.40
Fri.	18	7	48	44.70	10.054	21	6	6.7	26.02	15	46.17	67.80	5	58.41
Sat.	19	7	52	45.76	10.032	20	55	31.6	-26.90	15	46.23	67.73	6	2.90
SUN.	20	7	56	46.28	10.010	20	44	35.3	27.78	15	46.29	67.65	6	6.85
Mon.	21	8	0	46.25	9.987	20	33	18.1	28.64	15	46.36	67.57	6	10.25
Tues.	22	8	4	45.67	9.964	20	21	40.1	-29.50	15	46.44	67.49	6	13.10
Wed.	23	8	8	44.53	9.941	20	9	41.6	30.36	15	46.52	67.41	6	15.40
Thur.	24	8	12	42.83	9.918	19	57	22.9	31.20	15	46.60	67.32	6	17.14
Fri.	25	8	16	40.57	9.894	19	44	44.2	-32.02	15	46.69	67.24	6	18.31
Sat.	26	8	20	37.73	9.870	19	31	45.7	32.84	15	46.78	67.15	6	18.92
SUN.	27	8	24	34.31	9.846	19	18	27.7	33.65	15	46.88	67.07	6	18.95
Mon.	28	8	28	30.31	9.822	19	4	50.4	-34.45	15	46.98	66.98	6	18.40
Tues.	29	8	32	25.73	9.797	18	50	54.1	35.24	15	47.08	66.90	6	17.27
Wed.	30	8	36	20.56	9.773	18	36	39.1	36.01	15	47.19	66.81	6	15.55
Thur.	31	8	40	14.80	9.748	18	22	5.7	36.77	15	47.30	66.73	6	13.23
Fri.	32	8	44	8.44	9.723	N.18	7	14.1	-37.52	15	47.42	66.64	6	10.32

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^m.19 from sidereal time.
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Tues.	1	6 39 14.36	10.348	N.23 8 47.2	− 9.70	3 30.53	0.491	6 35 43.82
Wed.	2	6 43 22.59	10.337	23 4 42.3	10.71	3 42.21	0.481	6 39 40.38
Thur.	3	6 47 30.56	10.326	23 0 13.1	11.72	3 53.62	0.470	6 43 36.94
Fri.	4	6 51 38.25	10.314	22 55 19.8	−12.72	4 4.75	0.457	6 47 33.50
Sat.	5	6 55 45.63	10.300	22 50 2.5	13.72	4 15.57	0.444	6 51 30.06
SUN.	6	6 59 52.67	10.285	22 44 21.3	14.71	4 26.06	0.429	6 55 26.61
Mon.	7	7 3 59.35	10.270	22 38 16.4	−15.69	4 36.18	0.414	6 59 23.17
Tues.	8	7 8 5.65	10.254	22 31 48.0	16.67	4 45.92	0.397	7 3 19.73
Wed.	9	7 12 11.54	10.237	22 24 56.2	17.64	4 55.25	0.380	7 7 16.29
Thur.	10	7 16 17.01	10.219	22 17 41.2	−18.60	5 4.16	0.362	7 11 12.85
Fri.	11	7 20 22.04	10.200	22 10 3.1	19.56	5 12.63	0.343	7 15 9.40
Sat.	12	7 24 26.61	10.181	22 2 2.3	20.51	5 20.64	0.324	7 19 5.96
SUN.	13	7 28 30.70	10.161	21 53 38.9	−21.44	5 28.18	0.304	7 23 2.52
Mon.	14	7 32 34.31	10.140	21 44 53.0	22.37	5 35.23	0.284	7 26 59.08
Tues.	15	7 36 37.43	10.119	21 35 44.9	23.30	5 41.79	0.263	7 30 55.64
Wed.	16	7 40 40.04	10.098	21 26 14.8	−24.21	5 47.84	0.242	7 34 52.20
Thur.	17	7 44 42.13	10.076	21 16 22.9	25.11	5 53.38	0.220	7 38 48.75
Fri.	18	7 48 43.70	10.054	21 6 9.3	26.01	5 58.39	0.198	7 42 45.31
Sat.	19	7 52 44.75	10.032	20 55 34.3	−26.90	6 2.88	0.176	7 46 41.87
SUN.	20	7 56 45.26	10.010	20 44 38.1	27.78	6 6.83	0.153	7 50 38.42
Mon.	21	8 0 45.22	9.987	20 33 21.0	28.64	6 10.24	0.130	7 54 34.98
Tues.	22	8 4 44.63	9.964	20 21 43.2	−29.50	6 13.10	0.107	7 58 31.54
Wed.	23	8 8 43.49	9.941	20 9 44.9	30.35	6 15.40	0.084	8 2 28.10
Thur.	24	8 12 41.79	9.918	19 57 26.2	31.19	6 17.14	0.061	8 6 24.66
Fri.	25	8 16 39.53	9.894	19 44 47.6	−32.02	6 18.31	0.037	8 10 21.21
Sat.	26	8 20 36.69	9.870	19 31 49.2	32.84	6 18.92	0.013	8 14 17.77
SUN.	27	8 24 33.27	9.846	19 18 31.2	33.65	6 18.95	0.011	8 18 14.33
Mon.	28	8 28 29.28	9.822	19 4 54.0	−34.45	6 18.40	0.035	8 22 10.88
Tues.	29	8 32 24.71	9.797	18 50 57.8	35.23	6 17.27	0.059	8 26 7.44
Wed.	30	8 36 19.55	9.773	18 36 42.9	36.00	6 15.54	0.084	8 30 4.00
Thur.	31	8 40 13.79	9.748	18 22 9.5	36.77	6 13.23	0.109	8 34 0.56
Fri.	32	8 44 7.44	9.723	N.18 7 18.0	−37.52	6 10.33	0.134	8 37 57.11

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour.
+9^s.8565.
(Table III.)

AT GREENWICH MEAN NOON.													
Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.			
		True Longitude.			Diff. for 1 Hour.	Latitude.							
		λ	λ'										
		°	'	"	'	"	"	"			h	m	s
1	182	99	1	8.0	0	42.0	143.05	+ 0.29	0.007 2157	+ 2.7	17	21	25.10
2	183	99	58	21.3	57	55.2	143.05	0.32	0.007 2210	1.6	17	17	29.19
3	184	100	55	34.7	55	8.4	143.06	0.32	0.007 2236	+ 0.5	17	13	33.28
4	185	101	52	48.2	52	21.7	143.06	+ 0.29	0.007 2236	− 0.6	17	9	37.36
5	186	102	50	1.7	49	35.0	143.06	0.23	0.007 2209	1.7	17	5	41.45
6	187	103	47	15.1	46	48.2	143.06	0.14	0.007 2155	2.8	17	1	45.54
7	188	104	44	28.4	44	1.3	143.05	+ 0.03	0.007 2075	− 3.9	16	57	49.63
8	189	105	41	41.6	41	14.3	143.05	− 0.10	0.007 1970	4.9	16	53	53.71
9	190	106	38	54.7	38	27.2	143.04	0.24	0.007 1841	5.9	16	49	57.80
10	191	107	36	7.6	35	40.0	143.04	− 0.36	0.007 1690	− 6.8	16	46	1.89
11	192	108	33	20.5	32	52.7	143.04	0.48	0.007 1518	7.6	16	42	5.98
12	193	109	30	33.3	30	5.3	143.04	0.59	0.007 1326	8.4	16	38	10.06
13	194	110	27	46.1	27	17.9	143.04	− 0.68	0.007 1116	− 9.1	16	34	14.15
14	195	111	24	59.0	24	30.6	143.05	0.74	0.007 0889	9.8	16	30	18.24
15	196	112	22	12.0	21	43.4	143.05	0.78	0.007 0647	10.4	16	26	22.33
16	197	113	19	25.2	18	56.4	143.06	− 0.78	0.007 0389	− 11.0	16	22	26.42
17	198	114	16	38.7	16	9.8	143.07	0.75	0.007 0117	11.6	16	18	30.50
18	199	115	13	52.5	13	23.5	143.09	0.70	0.006 9831	12.2	16	14	34.59
19	200	116	11	6.9	10	37.7	143.11	− 0.63	0.006 9530	− 12.8	16	10	38.68
20	201	117	8	21.9	7	52.5	143.13	0.54	0.006 9215	13.4	16	6	42.77
21	202	118	5	37.5	5	7.9	143.16	0.42	0.006 8885	14.0	16	2	46.86
22	203	119	2	53.8	2	24.0	143.19	− 0.30	0.006 8539	− 14.7	15	58	50.95
23	204	119	60	10.8	59	40.9	143.23	0.18	0.006 8177	15.4	15	54	55.03
24	205	120	57	28.7	56	58.6	143.26	− 0.06	0.006 7799	16.1	15	50	59.12
25	206	121	54	47.5	54	17.2	143.30	+ 0.05	0.006 7404	− 16.9	15	47	3.21
26	207	122	52	7.3	51	36.8	143.34	0.15	0.006 6990	17.7	15	43	7.30
27	208	123	49	28.0	48	57.4	143.38	0.23	0.006 6557	18.5	15	39	11.39
28	209	124	46	49.7	46	18.9	143.42	+ 0.29	0.006 6104	− 19.4	15	35	15.48
29	210	125	44	12.4	43	41.5	143.47	0.33	0.006 5630	20.4	15	31	19.57
30	211	126	41	36.2	41	5.2	143.51	0.33	0.006 5133	21.3	15	27	23.66
31	212	127	39	1.1	38	29.9	143.56	0.31	0.006 4613	22.3	15	23	27.74
32	213	128	36	27.0	35	55.6	143.60	+ 0.25	0.006 4069	− 23.3	15	19	31.83

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour.
−9^s.8296.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S								
SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
' "	' "	' "	"	' "	"	h m	m	d
15 38.9	15 45.4	57 19.98	+1.997	57 43.87	+1.978	22 20.0	2.48	26.7
15 51.8	15 57.9	58 7.26	1.913	58 29.64	1.809	23 21.4	2.60	27.7
16 3.6	16 8.8	58 50.55	1.667	59 9.52	1.487	0	.	28.7
16 13.3	16 17.1	59 26.13	+1.275	59 40.03	+1.038	0 24.2	2.60	0.3
16 20.1	16 22.2	59 50.96	0.781	59 58.75	+0.517	1 25.5	2.49	1.3
16 23.4	16 23.8	60 3.36	+0.252	60 4.83	-0.004	2 23.2	2.32	2.3
16 23.4	16 22.2	60 3.31	-0.246	59 59.00	-0.467	3 16.9	2.16	3.3
16 20.4	16 17.9	59 52.19	0.663	59 43.20	0.831	4 7.2	2.05	4.3
16 15.0	16 11.6	59 32.37	0.970	59 20.01	1.084	4 55.5	1.99	5.3
16 7.9	16 4.0	59 6.44	-1.172	58 51.98	-1.234	5 43.1	1.99	6.3
15 59.9	15 55.6	58 36.89	1.278	58 21.38	1.304	6 31.5	2.05	7.3
15 51.3	15 47.0	58 5.62	1.320	57 49.76	1.323	7 21.8	2.15	8.3
15 42.7	15 38.4	57 33.90	-1.319	57 18.13	-1.308	8 14.7	2.26	9.3
15 34.2	15 29.9	57 2.51	1.294	56 47.08	1.277	9 10.0	2.34	10.3
15 25.8	15 21.7	56 31.86	1.259	56 16.90	1.234	10 6.6	2.36	11.3
15 17.7	15 13.8	56 2.26	-1.205	55 48.01	-1.170	11 2.8	2.30	12.3
15 10.1	15 6.5	55 34.20	1.130	55 20.91	1.082	11 56.7	2.18	13.3
15 3.0	14 59.8	55 8.27	1.023	54 56.41	0.954	12 47.1	2.02	14.3
14 56.8	14 54.1	54 45.44	-0.872	54 35.52	-0.778	13 33.7	1.87	15.3
14 51.7	14 49.7	54 26.81	0.670	54 19.47	0.550	14 16.9	1.74	16.3
14 48.2	14 47.0	54 13.67	0.415	54 9.57	-0.267	14 57.5	1.65	17.3
14 46.4	14 46.4	54 7.31	-0.106	54 7.06	+0.066	15 36.6	1.61	18.3
14 46.9	14 48.0	54 8.95	+0.251	54 13.10	0.442	16 15.3	1.62	19.3
14 49.8	14 52.2	54 19.60	0.643	54 28.52	0.846	16 54.8	1.68	20.3
14 55.3	14 59.0	54 39.89	+1.049	54 53.71	+1.254	17 36.3	1.79	21.3
15 3.5	15 8.5	55 9.96	1.453	55 28.54	1.640	18 21.0	1.95	22.3
15 14.2	15 20.4	55 49.29	1.814	56 12.02	1.969	19 10.1	2.15	23.3
15 27.1	15 34.1	56 36.47	+2.100	57 2.31	+2.200	20 4.3	2.36	24.3
15 41.4	15 48.8	57 29.13	2.260	57 56.45	2.284	21 3.3	2.54	25.3
15 56.3	16 3.6	58 23.75	2.259	58 50.43	2.180	22 5.4	2.61	26.3
16 10.5	16 16.9	59 15.85	2.047	59 39.36	1.862	23 8.0	2.56	27.3
16 22.6	16 27.5	60 0.35	+1.628	60 18.26	+1.350	0	.	28.3

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 1.					THURSDAY 3.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	4 4 9.25	2.3927	N.25 28 47.5	7.580	0	6 6 39.81	2.6637	N.28 27 14.6	0.690
1	4 6 33.05	2.4007	25 36 18.2	7.442	1	6 9 19.69	2.6656	28 26 30.9	0.826
2	4 8 57.33	2.4086	25 43 40.5	7.303	2	6 11 59.68	2.6673	28 25 35.5	1.022
3	4 11 22.08	2.4164	25 50 54.5	7.162	3	6 14 39.77	2.6689	28 24 28.3	1.218
4	4 13 47.30	2.4242	25 58 0.0	7.019	4	6 17 19.95	2.6703	28 23 9.3	1.415
5	4 16 12.99	2.4320	26 4 56.8	6.875	5	6 20 0.20	2.6714	28 21 38.5	1.612
6	4 18 39.14	2.4397	26 11 45.0	6.730	6	6 22 40.52	2.6725	28 19 55.9	1.809
7	4 21 5.75	2.4473	26 18 24.4	6.583	7	6 25 20.90	2.6733	28 18 1.4	2.007
8	4 23 32.82	2.4550	26 24 54.9	6.433	8	6 28 1.32	2.6739	28 15 55.1	2.204
9	4 26 0.35	2.4625	26 31 16.4	6.283	9	6 30 41.77	2.6743	28 13 36.9	2.402
10	4 28 28.32	2.4699	26 37 28.9	6.132	10	6 33 22.24	2.6746	28 11 6.8	2.600
11	4 30 56.74	2.4773	26 43 32.2	5.978	11	6 36 2.72	2.6747	28 8 24.9	2.797
12	4 33 25.60	2.4846	26 49 26.2	5.822	12	6 38 43.20	2.6745	28 5 31.2	2.994
13	4 35 54.89	2.4918	26 55 10.8	5.665	13	6 41 23.66	2.6742	28 2 25.6	3.192
14	4 38 24.61	2.4989	27 0 46.0	5.507	14	6 44 4.10	2.6737	27 59 8.2	3.389
15	4 40 54.76	2.5060	27 6 11.7	5.347	15	6 46 44.50	2.6729	27 55 38.9	3.587
16	4 43 25.33	2.5129	27 11 27.7	5.186	16	6 49 24.85	2.6720	27 51 57.8	3.783
17	4 45 56.31	2.5197	27 16 34.0	5.023	17	6 52 5.14	2.6710	27 48 4.9	3.979
18	4 48 27.69	2.5264	27 21 30.5	4.858	18	6 54 45.37	2.6698	27 44 0.3	4.175
19	4 50 59.48	2.5331	27 26 17.0	4.692	19	6 57 25.52	2.6683	27 39 43.9	4.371
20	4 53 31.66	2.5396	27 30 53.5	4.525	20	7 0 5.57	2.6667	27 35 15.8	4.566
21	4 56 4.23	2.5460	27 35 20.0	4.357	21	7 2 45.52	2.6650	27 30 36.0	4.760
22	4 58 37.18	2.5522	27 39 36.3	4.186	22	7 5 25.37	2.6631	27 25 44.6	4.954
23	5 1 10.50	2.5584	N.27 43 42.3	4.014	23	7 8 5.09	2.6609	N.27 20 41.5	5.148
WEDNESDAY 2.					FRIDAY 4.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	5 3 44.19	2.5645	N.27 47 38.0	3.842	0	7 10 44.68	2.6586	N.27 15 26.8	5.342
1	5 6 18.24	2.5704	27 51 23.3	3.668	1	7 13 24.12	2.6561	27 10 0.5	5.533
2	5 8 52.64	2.5762	27 54 58.1	3.492	2	7 16 3.41	2.6535	27 4 22.8	5.724
3	5 11 27.38	2.5818	27 58 22.3	3.315	3	7 18 42.54	2.6507	26 58 33.6	5.915
4	5 14 2.45	2.5873	28 1 35.9	3.137	4	7 21 21.49	2.6477	26 52 33.0	6.105
5	5 16 37.85	2.5927	28 4 38.8	2.958	5	7 24 0.26	2.6446	26 46 21.0	6.294
6	5 19 13.57	2.5978	28 7 30.9	2.777	6	7 26 38.84	2.6413	26 39 57.7	6.482
7	5 21 49.59	2.6028	28 10 12.1	2.596	7	7 29 17.22	2.6379	26 33 23.1	6.669
8	5 24 25.91	2.6078	28 12 42.4	2.413	8	7 31 55.39	2.6344	26 26 37.4	6.855
9	5 27 2.52	2.6126	28 15 1.7	2.230	9	7 34 33.35	2.6307	26 19 40.5	7.041
10	5 29 39.42	2.6172	28 17 10.0	2.046	10	7 37 11.08	2.6268	26 12 32.5	7.225
11	5 32 16.59	2.6217	28 19 7.2	1.860	11	7 39 48.57	2.6228	26 5 13.5	7.408
12	5 34 54.02	2.6259	28 20 53.2	1.673	12	7 42 25.82	2.6187	25 57 43.5	7.591
13	5 37 31.70	2.6300	28 22 28.0	1.485	13	7 45 2.81	2.6144	25 50 2.6	7.771
14	5 40 9.62	2.6340	28 23 51.4	1.296	14	7 47 39.55	2.6101	25 42 11.0	7.950
15	5 42 47.78	2.6378	28 25 3.5	1.107	15	7 50 16.02	2.6056	25 34 8.6	8.128
16	5 45 26.15	2.6413	28 26 4.2	0.917	16	7 52 52.22	2.6010	25 25 55.6	8.305
17	5 48 4.73	2.6447	28 26 53.5	0.726	17	7 55 28.14	2.5962	25 17 32.0	8.481
18	5 50 43.52	2.6480	28 27 31.3	0.533	18	7 58 3.77	2.5914	25 8 57.9	8.655
19	5 53 22.49	2.6510	28 27 57.5	0.341	19	8 0 39.11	2.5865	25 0 13.4	8.828
20	5 56 1.64	2.6539	28 28 12.2	+0.148	20	8 3 14.15	2.5814	24 51 18.5	9.000
21	5 58 40.96	2.6566	28 28 15.3	-0.046	21	8 5 48.88	2.5762	24 42 13.4	9.170
22	6 1 20.43	2.6591	28 28 6.7	0.240	22	8 8 23.30	2.5710	24 32 58.1	9.338
23	6 4 0.05	2.6615	28 27 46.5	0.434	23	8 10 57.40	2.5657	24 23 32.8	9.505
24	6 6 39.81	2.6637	N.28 27 14.6	0.690	24	8 13 31.18	2.5603	N.24 13 57.5	9.671

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 5.					MONDAY 7.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	8 13 31.18	2.5603	N.24 13 57.5	9.671	0	10 9 22.66	2.2676	N.13 52 27.3	15.499
1	8 16 4.63	2.5547	24 4 12.3	9.834	1	10 11 38.55	2.2622	13 36 55.1	15.574
2	8 18 37.74	2.5490	23 54 17.4	9.996	2	10 13 54.12	2.2567	13 21 18.4	15.647
3	8 21 10.51	2.5434	23 44 12.8	10.158	3	10 16 9.36	2.2513	13 5 37.4	15.717
4	8 23 42.94	2.5377	23 33 58.5	10.317	4	10 18 24.28	2.2461	12 49 52.3	15.786
5	8 26 15.03	2.5319	23 23 34.7	10.475	5	10 20 38.89	2.2408	12 34 3.1	15.853
6	8 28 46.77	2.5260	23 13 1.5	10.631	6	10 22 53.18	2.2357	12 18 9.9	15.918
7	8 31 18.15	2.5200	23 2 19.0	10.785	7	10 25 7.17	2.2306	12 2 12.9	15.982
8	8 33 49.17	2.5140	22 51 27.3	10.937	8	10 27 20.85	2.2256	11 46 12.2	16.043
9	8 36 19.83	2.5080	22 40 26.5	11.088	9	10 29 34.24	2.2207	11 30 7.8	16.102
10	8 38 50.13	2.5019	22 29 16.7	11.237	10	10 31 47.33	2.2158	11 13 59.9	16.160
11	8 41 20.06	2.4958	22 17 58.0	11.385	11	10 34 0.13	2.2109	10 57 48.6	16.216
12	8 43 49.62	2.4896	22 6 30.5	11.530	12	10 36 12.64	2.2062	10 41 34.0	16.270
13	8 46 18.81	2.4833	21 54 54.4	11.673	13	10 38 24.87	2.2016	10 25 16.2	16.322
14	8 48 47.62	2.4770	21 43 9.7	11.815	14	10 40 36.83	2.1971	10 8 55.4	16.372
15	8 51 16.05	2.4708	21 31 16.6	11.955	15	10 42 48.52	2.1926	9 52 31.6	16.420
16	8 53 44.11	2.4645	21 19 15.1	12.093	16	10 44 59.94	2.1882	9 36 5.0	16.467
17	8 56 11.79	2.4582	21 7 5.4	12.229	17	10 47 11.10	2.1839	9 19 35.6	16.512
18	8 58 39.09	2.4518	20 54 47.6	12.364	18	10 49 22.01	2.1797	9 3 3.6	16.554
19	9 1 6.01	2.4454	20 42 21.7	12.497	19	10 51 32.66	2.1755	8 46 29.1	16.596
20	9 3 32.54	2.4390	20 29 48.0	12.627	20	10 53 43.07	2.1714	8 29 52.1	16.636
21	9 5 58.69	2.4327	20 17 6.5	12.756	21	10 55 53.23	2.1674	8 13 12.8	16.674
22	9 8 24.46	2.4262	20 4 17.3	12.883	22	10 58 3.16	2.1636	7 56 31.2	16.710
23	9 10 49.84	2.4198	N.19 51 20.5	13.008	23	11 0 12.86	2.1598	N. 7 39 47.6	16.743
SUNDAY 6.					TUESDAY 8.				
0	9 13 14.84	2.4135	N.19 38 16.3	13.131	0	11 2 22.34	2.1562	N. 7 23 2.0	16.776
1	9 15 39.46	2.4071	19 25 4.8	13.252	1	11 4 31.60	2.1525	7 6 14.5	16.807
2	9 18 3.69	2.4007	19 11 46.0	13.372	2	11 6 40.64	2.1489	6 49 25.2	16.837
3	9 20 27.54	2.3942	18 58 20.2	13.488	3	11 8 49.47	2.1455	6 32 34.1	16.864
4	9 22 51.00	2.3879	18 44 47.4	13.603	4	11 10 58.10	2.1422	6 15 41.5	16.889
5	9 25 14.09	2.3817	18 31 7.8	13.717	5	11 13 6.53	2.1389	5 58 47.4	16.913
6	9 27 36.80	2.3753	18 17 21.4	13.828	6	11 15 14.77	2.1357	5 41 51.9	16.936
7	9 29 59.12	2.3689	18 3 28.4	13.938	7	11 17 22.82	2.1327	5 24 55.1	16.957
8	9 32 21.07	2.3627	17 49 28.8	14.046	8	11 19 30.69	2.1297	5 7 57.1	16.976
9	9 34 42.65	2.3565	17 35 22.9	14.151	9	11 21 38.38	2.1268	4 50 58.0	16.993
10	9 37 3.85	2.3502	17 21 10.7	14.254	10	11 23 45.90	2.1240	4 33 57.9	17.009
11	9 39 24.67	2.3440	17 6 52.4	14.356	11	11 25 53.26	2.1213	4 16 56.9	17.023
12	9 41 45.13	2.3379	16 52 28.0	14.456	12	11 28 0.46	2.1187	3 59 55.1	17.036
13	9 44 5.22	2.3318	16 37 57.7	14.553	13	11 30 7.50	2.1161	3 42 52.6	17.047
14	9 46 24.94	2.3257	16 23 21.6	14.649	14	11 32 14.39	2.1137	3 25 49.5	17.057
15	9 48 44.30	2.3197	16 8 39.8	14.742	15	11 34 21.14	2.1114	3 8 45.8	17.065
16	9 51 3.30	2.3137	15 53 52.5	14.834	16	11 36 27.76	2.1092	2 51 41.7	17.071
17	9 53 21.94	2.3077	15 38 59.7	14.924	17	11 38 34.24	2.1069	2 34 37.3	17.075
18	9 55 40.23	2.3018	15 24 1.6	15.012	18	11 40 40.59	2.1049	2 17 32.7	17.078
19	9 57 58.16	2.2959	15 8 58.3	15.098	19	11 42 46.83	2.1030	2 0 27.9	17.080
20	10 0 15.74	2.2902	14 53 49.0	15.182	20	11 44 52.95	2.1011	1 43 23.1	17.080
21	10 2 32.98	2.2845	14 38 36.4	15.264	21	11 46 58.96	2.0993	1 26 18.3	17.078
22	10 4 49.88	2.2788	14 23 18.1	15.345	22	11 49 4.86	2.0976	1 9 13.7	17.075
23	10 7 6.44	2.2732	14 7 55.0	15.423	23	11 51 10.67	2.0960	0 52 9.3	17.071
24	10 9 22.66	2.2676	N.13 52 27.3	15.499	24	11 53 16.39	2.0946	N. 0 35 5.2	17.065

JULY, 1913.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT  AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 21.					WEDNESDAY 23.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	22 27 40.67	1.8182	S. 11 38 13.2	13.172	0	23 52 13.24	1.7322	S. 0 35 55.9	14.142
1	22 29 29.66	1.8148	11 25 1.7	13.211	1	23 53 57.17	1.7322	0 21 47.3	14.145
2	22 31 18.45	1.8114	11 11 47.9	13.248	2	23 55 41.11	1.7323	S. 0 7 38.5	14.148
3	22 33 7.03	1.8081	10 58 31.9	13.284	3	23 57 25.05	1.7324	N. 0 6 30.5	14.150
4	22 34 55.42	1.8048	10 45 13.8	13.320	4	23 59 9.00	1.7327	0 20 39.5	14.150
5	22 36 43.61	1.8017	10 31 53.5	13.355	5	0 0 52.97	1.7331	0 34 48.5	14.150
6	22 38 31.62	1.7986	10 18 31.2	13.388	6	0 2 36.97	1.7335	0 48 57.5	14.150
7	22 40 19.44	1.7955	10 5 6.9	13.422	7	0 4 20.99	1.7339	1 3 6.5	14.150
8	22 42 7.08	1.7925	9 51 40.6	13.455	8	0 6 5.04	1.7345	1 17 15.5	14.148
9	22 43 54.54	1.7896	9 38 12.3	13.487	9	0 7 49.13	1.7352	1 31 24.3	14.145
10	22 45 41.83	1.7868	9 24 42.2	13.517	10	0 9 33.26	1.7358	1 45 32.9	14.142
11	22 47 28.95	1.7840	9 11 10.3	13.547	11	0 11 17.43	1.7366	1 59 41.4	14.139
12	22 49 15.91	1.7813	8 57 36.6	13.576	12	0 13 1.65	1.7375	2 13 49.6	14.134
13	22 51 2.71	1.7787	8 44 1.2	13.604	13	0 14 45.93	1.7384	2 27 57.5	14.129
14	22 52 49.35	1.7761	8 30 24.1	13.632	14	0 16 30.26	1.7394	2 42 5.1	14.123
15	22 54 35.84	1.7736	8 16 45.3	13.659	15	0 18 14.66	1.7405	2 56 12.3	14.117
16	22 56 22.18	1.7712	8 3 5.0	13.685	16	0 19 59.12	1.7417	3 10 19.2	14.111
17	22 58 8.38	1.7688	7 49 23.1	13.711	17	0 21 43.66	1.7430	3 24 25.6	14.103
18	22 59 54.44	1.7665	7 35 39.7	13.735	18	0 23 28.28	1.7443	3 38 31.5	14.094
19	23 1 40.36	1.7643	7 21 54.9	13.759	19	0 25 12.98	1.7457	3 52 36.9	14.085
20	23 3 26.15	1.7622	7 8 8.6	13.782	20	0 26 57.77	1.7472	4 6 41.7	14.076
21	23 5 11.82	1.7602	6 54 21.0	13.804	21	0 28 42.65	1.7488	4 20 46.0	14.066
22	23 6 57.37	1.7582	6 40 32.1	13.826	22	0 30 27.62	1.7504	4 34 49.6	14.054
23	23 8 42.80	1.7562	S. 6 26 41.9	13.847	23	0 32 12.70	1.7522	N. 4 48 52.5	14.042
TUESDAY 22.					THURSDAY 24.				
0	23 10 28.11	1.7543	S. 6 12 50.4	13.867	0	0 33 57.88	1.7540	N. 5 2 54.6	14.029
1	23 12 13.31	1.7525	5 58 57.8	13.887	1	0 35 43.18	1.7559	5 16 56.0	14.017
2	23 13 58.41	1.7509	5 45 4.0	13.906	2	0 37 28.59	1.7578	5 30 56.6	14.003
3	23 15 43.42	1.7493	5 31 9.1	13.923	3	0 39 14.12	1.7598	5 44 56.3	13.988
4	23 17 28.33	1.7477	5 17 13.2	13.941	4	0 40 59.77	1.7620	5 58 55.2	13.973
5	23 19 13.14	1.7462	5 3 16.2	13.957	5	0 42 45.56	1.7642	6 12 53.1	13.957
6	23 20 57.87	1.7447	4 49 18.3	13.973	6	0 44 31.48	1.7665	6 26 50.0	13.940
7	23 22 42.51	1.7434	4 35 19.4	13.989	7	0 46 17.54	1.7689	6 40 45.9	13.922
8	23 24 27.08	1.7422	4 21 19.6	14.003	8	0 48 3.75	1.7714	6 54 40.7	13.904
9	23 26 11.57	1.7410	4 7 19.0	14.017	9	0 49 50.11	1.7739	7 8 34.4	13.886
10	23 27 56.00	1.7399	3 53 17.6	14.030	10	0 51 36.62	1.7765	7 22 27.0	13.867
11	23 29 40.36	1.7389	3 39 15.4	14.042	11	0 53 23.29	1.7792	7 36 18.4	13.846
12	23 31 24.67	1.7380	3 25 12.5	14.054	12	0 55 10.12	1.7819	7 50 8.5	13.824
13	23 33 8.92	1.7370	3 11 8.9	14.065	13	0 56 57.12	1.7848	8 3 57.3	13.802
14	23 34 53.11	1.7362	2 57 4.7	14.076	14	0 58 44.30	1.7877	8 17 44.8	13.780
15	23 36 37.26	1.7355	2 42 59.8	14.086	15	1 0 31.65	1.7907	8 31 30.9	13.757
16	23 38 21.37	1.7348	2 28 54.4	14.094	16	1 2 19.19	1.7938	8 45 15.6	13.733
17	23 40 5.44	1.7342	2 14 48.5	14.102	17	1 4 6.91	1.7970	8 58 58.9	13.708
18	23 41 49.47	1.7337	2 0 42.1	14.110	18	1 5 54.83	1.8003	9 12 40.6	13.683
19	23 43 33.48	1.7332	1 46 35.3	14.117	19	1 7 42.95	1.8037	9 26 20.8	13.657
20	23 45 17.46	1.7328	1 32 28.0	14.124	20	1 9 31.27	1.8070	9 39 59.4	13.629
21	23 47 1.42	1.7326	1 18 20.4	14.129	21	1 11 19.79	1.8105	9 53 36.3	13.601
22	23 48 45.37	1.7324	1 4 12.5	14.134	22	1 13 8.53	1.8142	10 7 11.5	13.572
23	23 50 29.31	1.7323	0 50 4.3	14.138	23	1 14 57.49	1.8178	10 20 45.0	13.542
24	23 52 13.24	1.7322	S. 0 35 55.9	14.142	24	1 16 46.67	1.8215	N. 10 34 16.6	13.512

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 25.					SUNDAY 27.				
0	1 16 46.67	1.8215	N.10 34 16.6	13.512	0	2 50 1.48	2.0923	N.20 30 6.2	10.907
1	1 18 36.07	1.8253	10 47 46.4	13.481	1	2 52 7.24	2.0997	20 40 58.1	10.824
2	1 20 25.71	1.8292	11 1 14.3	13.448	2	2 54 13.44	2.1071	20 51 45.1	10.741
3	1 22 15.58	1.8332	11 14 40.2	13.416	3	2 56 20.09	2.1146	21 2 27.0	10.656
4	1 24 5.70	1.8373	11 28 4.2	13.382	4	2 58 27.19	2.1220	21 13 3.8	10.569
5	1 25 56.06	1.8414	11 41 26.1	13.347	5	3 0 34.73	2.1295	21 23 35.3	10.480
6	1 27 46.67	1.8457	11 54 45.9	13.312	6	3 2 42.73	2.1372	21 34 1.4	10.391
7	1 29 37.54	1.8500	12 8 3.5	13.275	7	3 4 51.19	2.1448	21 44 22.2	10.301
8	1 31 28.67	1.8544	12 21 18.9	13.238	8	3 7 0.10	2.1524	21 54 37.5	10.208
9	1 33 20.07	1.8589	12 34 32.1	13.201	9	3 9 9.48	2.1602	22 4 47.2	10.114
10	1 35 11.74	1.8634	12 47 43.0	13.162	10	3 11 19.32	2.1679	22 14 51.2	10.019
11	1 37 3.68	1.8680	13 0 51.5	13.121	11	3 13 29.63	2.1757	22 24 49.5	9.922
12	1 38 55.90	1.8728	13 13 57.5	13.079	12	3 15 40.40	2.1835	22 34 41.9	9.824
13	1 40 48.41	1.8776	13 27 1.0	13.038	13	3 17 51.65	2.1914	22 44 28.4	9.725
14	1 42 41.21	1.8824	13 40 2.0	12.996	14	3 20 3.37	2.1993	22 54 8.9	9.624
15	1 44 34.30	1.8873	13 53 0.5	12.952	15	3 22 15.56	2.2072	23 3 43.3	9.522
16	1 46 27.69	1.8924	14 5 56.3	12.907	16	3 24 28.23	2.2152	23 13 11.5	9.418
17	1 48 21.39	1.8975	14 18 49.3	12.861	17	3 26 41.38	2.2231	23 22 33.4	9.313
18	1 50 15.39	1.9027	14 31 39.6	12.815	18	3 28 55.00	2.2311	23 31 48.9	9.205
19	1 52 9.71	1.9080	14 44 27.1	12.767	19	3 31 9.11	2.2392	23 40 58.0	9.097
20	1 54 4.35	1.9133	14 57 11.7	12.718	20	3 33 23.70	2.2472	23 50 0.5	8.986
21	1 55 59.31	1.9187	15 9 53.3	12.669	21	3 35 38.77	2.2552	23 58 56.3	8.874
22	1 57 54.59	1.9242	15 22 32.0	12.619	22	3 37 54.33	2.2633	24 7 45.4	8.762
23	1 59 50.21	1.9298	N.15 35 7.6	12.567	23	3 40 10.37	2.2714	N.24 16 27.7	8.647
SATURDAY 26.					MONDAY 28.				
0	2 1 46.17	1.9355	N.15 47 40.0	12.513	0	3 42 26.89	2.2795	N.24 25 3.0	8.530
1	2 3 42.47	1.9412	16 0 9.2	12.460	1	3 44 43.91	2.2876	24 33 31.3	8.412
2	2 5 39.11	1.9469	16 12 35.2	12.406	2	3 47 1.41	2.2957	24 41 52.5	8.293
3	2 7 36.10	1.9528	16 24 57.9	12.350	3	3 49 19.39	2.3038	24 50 6.5	8.172
4	2 9 33.45	1.9588	16 37 17.2	12.293	4	3 51 37.86	2.3119	24 58 13.1	8.048
5	2 11 31.15	1.9648	16 49 33.1	12.235	5	3 53 56.82	2.3200	25 6 12.3	7.925
6	2 13 29.22	1.9709	17 1 45.4	12.175	6	3 56 16.26	2.3280	25 14 4.1	7.800
7	2 15 27.66	1.9771	17 13 54.1	12.115	7	3 58 36.18	2.3361	25 21 48.3	7.673
8	2 17 26.47	1.9833	17 25 59.2	12.054	8	4 0 56.59	2.3442	25 29 24.8	7.543
9	2 19 25.66	1.9897	17 38 0.6	11.992	9	4 3 17.48	2.3522	25 36 53.5	7.412
10	2 21 25.23	1.9960	17 49 58.2	11.928	10	4 5 38.85	2.3602	25 44 14.3	7.280
11	2 23 25.18	2.0024	18 1 52.0	11.863	11	4 8 0.70	2.3682	25 51 27.1	7.147
12	2 25 25.52	2.0090	18 13 41.8	11.797	12	4 10 23.03	2.3762	25 58 31.9	7.012
13	2 27 26.26	2.0156	18 25 27.6	11.729	13	4 12 45.84	2.3841	26 5 28.5	6.875
14	2 29 27.39	2.0223	18 37 9.3	11.661	14	4 15 9.12	2.3919	26 12 16.9	6.737
15	2 31 28.93	2.0290	18 48 46.9	11.591	15	4 17 32.87	2.3998	26 18 56.9	6.596
16	2 33 30.87	2.0358	19 0 20.2	11.520	16	4 19 57.09	2.4076	26 25 28.4	6.453
17	2 35 33.22	2.0427	19 11 49.3	11.448	17	4 22 21.78	2.4153	26 31 51.3	6.310
18	2 37 35.99	2.0496	19 23 14.0	11.375	18	4 24 46.93	2.4231	26 38 5.6	6.166
19	2 39 39.17	2.0566	19 34 34.3	11.300	19	4 27 12.55	2.4308	26 44 11.2	6.019
20	2 41 42.78	2.0637	19 45 50.0	11.223	20	4 29 38.62	2.4383	26 50 7.9	5.871
21	2 43 46.81	2.0708	19 57 1.1	11.147	21	4 32 5.14	2.4458	26 55 55.7	5.722
22	2 45 51.27	2.0779	20 8 7.6	11.068	22	4 34 32.12	2.4533	27 1 34.5	5.571
23	2 47 56.16	2.0851	20 19 9.3	10.988	23	4 36 59.54	2.4608	27 7 4.2	5.418
24	2 50 1.48	2.0923	N.20 30 6.2	10.907	24	4 39 27.41	2.4682	N.27 12 24.6	5.263

GREENWICH MEAN TIME.

THE MOON'S RIGHT

AND DECLINATION.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		
		^h ^m ^s	^s	[°] ['] ["]	["]	['] ["]	^s	^m ^s
Fri.	1	8 44 8.44	9.723	N.18 7 14.1	-37.52	15 47.42	66.64	6 10.32
Sat.	2	8 48 1.48	9.697	17 52 4.7	38.25	15 47.54	66.55	6 6.80
SUN.	3	8 51 53.91	9.671	17 36 37.9	38.98	15 47.67	66.46	6 2.68
Mon.	4	8 55 45.72	9.645	17 20 53.8	-39.69	15 47.81	66.37	5 57.96
Tues.	5	8 59 36.92	9.620	17 4 52.8	40.39	15 47.95	66.28	5 52.62
Wed.	6	9 3 27.50	9.594	16 48 35.3	41.07	15 48.10	66.19	5 46.66
Thur.	7	9 7 17.47	9.569	16 32 1.5	-41.74	15 48.25	66.11	5 40.09
Fri.	8	9 11 6.83	9.544	16 15 11.8	42.40	15 48.40	66.02	5 32.91
Sat.	9	9 14 55.59	9.519	15 58 6.6	43.04	15 48.55	65.94	5 25.13
SUN.	10	9 18 43.74	9.494	15 40 46.1	-43.67	15 48.71	65.86	5 16.75
Mon.	11	9 22 31.29	9.469	15 23 10.7	44.28	15 48.88	65.78	5 7.77
Tues.	12	9 26 18.26	9.445	15 5 20.6	44.88	15 49.05	65.70	4 58.21
Wed.	13	9 30 4.66	9.421	14 47 16.1	-45.48	15 49.22	65.62	4 48.08
Thur.	14	9 33 50.49	9.398	14 28 57.6	46.06	15 49.40	65.54	4 37.38
Fri.	15	9 37 35.77	9.375	14 10 25.3	46.63	15 49.58	65.46	4 26.14
Sat.	16	9 41 20.51	9.353	13 51 39.5	-47.19	15 49.76	65.38	4 14.36
SUN.	17	9 45 4.73	9.332	13 32 40.5	47.73	15 49.94	65.31	4 2.06
Mon.	18	9 48 48.43	9.311	13 13 28.6	48.26	15 50.12	65.23	3 49.25
Tues.	19	9 52 31.64	9.290	12 54 4.1	-48.78	15 50.30	65.16	3 35.94
Wed.	20	9 56 14.36	9.270	12 34 27.3	49.28	15 50.49	65.09	3 22.14
Thur.	21	9 59 56.61	9.251	12 14 38.6	49.78	15 50.68	65.02	3 7.87
Fri.	22	10 3 38.41	9.232	11 54 38.1	-50.26	15 50.87	64.95	2 53.15
Sat.	23	10 7 19.77	9.214	11 34 26.2	50.73	15 51.07	64.88	2 38.00
SUN.	24	10 11 0.70	9.197	11 14 3.2	51.18	15 51.27	64.82	2 22.42
Mon.	25	10 14 41.22	9.180	10 53 29.4	-51.62	15 51.47	64.76	2 6.43
Tues.	26	10 18 21.34	9.164	10 32 45.1	52.06	15 51.67	64.70	1 50.03
Wed.	27	10 22 1.08	9.148	10 11 50.6	52.48	15 51.88	64.64	1 33.26
Thur.	28	10 25 40.45	9.133	9 50 46.2	-52.88	15 52.09	64.58	1 16.13
Fri.	29	10 29 19.47	9.118	9 29 32.4	53.26	15 52.30	64.53	0 58.64
Sat.	30	10 32 58.14	9.104	9 8 9.5	53.63	15 52.52	64.48	0 40.81
SUN.	31	10 36 36.48	9.091	8 46 37.8	54.00	15 52.74	64.43	0 22.65
Mon.	32	10 40 14.50	9.078	N. 8 24 57.6	-54.35	15 52.97	64.38	0 4.17

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.19 from sidereal time.
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Fri.	1	8 44 7.44	9.723	N. 18 7 18.0	-37.52	6 10.33	0.134	8 37 57.11
Sat.	2	8 48 0.48	9.698	17 52 8.6	38.25	6 6.82	0.159	8 41 53.67
SUN.	3	8 51 52.53	9.672	17 36 41.8	38.98	6 2.70	0.184	8 45 50.22
Mon.	4	8 55 44.76	9.646	17 20 57.7	-39.69	5 57.98	0.210	8 49 46.78
Tues.	5	8 59 35.98	9.621	17 4 56.7	40.39	5 52.64	0.235	8 53 43.34
Wed.	6	9 3 26.58	9.595	16 48 39.2	41.07	5 46.69	0.261	8 57 39.90
Thur.	7	9 7 16.57	9.570	16 32 5.4	-41.74	5 40.12	0.286	9 1 36.45
Fri.	8	9 11 5.95	9.545	16 15 15.7	42.40	5 32.94	0.312	9 5 33.01
Sat.	9	9 14 54.73	9.520	15 58 10.5	43.04	5 25.16	0.337	9 9 29.56
SUN.	10	9 18 42.90	9.495	15 40 50.0	-43.67	5 16.78	0.362	9 13 26.12
Mon.	11	9 22 30.48	9.470	15 23 14.5	44.29	5 7.80	0.386	9 17 22.68
Tues.	12	9 26 17.48	9.446	15 5 24.3	44.89	4 58.24	0.410	9 21 19.23
Wed.	13	9 30 3.91	9.423	14 47 19.7	-45.48	4 48.11	0.434	9 25 15.79
Thur.	14	9 33 49.77	9.400	14 29 1.1	46.06	4 37.42	0.457	9 29 12.34
Fri.	15	9 37 35.08	9.377	14 10 28.7	46.63	4 26.18	0.480	9 33 8.90
Sat.	16	9 41 19.85	9.355	13 51 42.8	-47.19	4 14.40	0.502	9 37 5.46
SUN.	17	9 45 4.10	9.333	13 32 43.7	47.73	4 2.09	0.523	9 41 2.01
Mon.	18	9 48 47.84	9.312	13 13 31.7	48.26	3 49.27	0.544	9 44 58.57
Tues.	19	9 52 31.08	9.292	12 54 7.0	-48.78	3 35.96	0.565	9 48 55.12
Wed.	20	9 56 13.84	9.272	12 34 30.1	49.29	3 22.17	0.585	9 52 51.68
Thur.	21	9 59 56.13	9.253	12 14 41.2	49.79	3 7.90	0.604	9 56 48.23
Fri.	22	10 3 37.97	9.234	11 54 40.5	-50.27	2 53.18	0.622	10 0 44.79
Sat.	23	10 7 19.37	9.216	11 34 28.4	50.74	2 38.02	0.640	10 4 41.34
SUN.	24	10 11 0.34	9.199	11 14 5.2	51.19	2 22.44	0.658	10 8 37.90
Mon.	25	10 14 40.90	9.182	10 53 31.2	-51.63	2 6.45	0.675	10 12 34.45
Tues.	26	10 18 21.06	9.166	10 32 46.7	52.07	1 50.05	0.691	10 16 31.01
Wed.	27	10 22 0.84	9.150	10 11 52.0	52.49	1 33.28	0.706	10 20 27.56
Thur.	28	10 25 40.26	9.135	9 50 47.4	-52.89	1 16.14	0.721	10 24 24.12
Fri.	29	10 29 19.32	9.120	9 29 33.3	53.28	0 58.65	0.736	10 28 20.67
Sat.	30	10 32 58.04	9.106	9 8 10.1	53.65	0 40.82	0.750	10 32 17.22
SUN.	31	10 36 36.43	9.093	8 46 38.0	54.01	0 22.65	0.764	10 36 13.78
Mon.	32	10 40 14.50	9.080	N. 8 24 57.4	-54.36	0 4.16	0.777	10 40 10.33

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign -- prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,
+9^s.8565.
(Table III.)

AT GREENWICH MEAN NOON.													
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.					
		True Longitude.		Diff. for 1 Hour.	Latitude.								
		λ	λ'										
		°	'	"	'	"	"	"		h	m	s	
1	213	128	36	27.0	35	55.6	143.60	+0.25	0.006 4069	-23.3	15	19	31.83
2	214	129	33	53.8	33	22.2	143.63	0.16	0.006 3500	24.3	15	15	35.92
3	215	130	31	21.5	30	49.8	143.67	+0.05	0.006 2906	25.3	15	11	40.01
4	216	131	28	50.1	28	18.2	143.71	-0.07	0.006 2287	-26.3	15	7	44.10
5	217	132	26	19.6	25	47.5	143.75	0.20	0.006 1645	27.2	15	3	48.19
6	218	133	23	49.8	23	17.6	143.78	0.34	0.006 0980	28.1	14	59	52.28
7	219	134	21	20.8	20	48.5	143.81	-0.47	0.006 0293	-29.0	14	55	56.37
8	220	135	18	52.6	18	20.1	143.84	0.60	0.005 9586	29.8	14	52	0.46
9	221	136	16	25.1	15	52.5	143.87	0.70	0.005 8861	30.5	14	48	4.55
10	222	137	13	58.5	13	25.7	143.91	-0.76	0.005 8120	-31.2	14	44	8.64
11	223	138	11	32.7	10	59.8	143.95	0.79	0.005 7364	31.8	14	40	12.73
12	224	139	9	7.9	8	34.8	143.99	0.80	0.005 6593	32.4	14	36	16.82
13	225	140	6	44.1	6	10.8	144.03	-0.78	0.005 5810	-32.9	14	32	20.91
14	226	141	4	21.3	3	47.9	144.07	0.74	0.005 5015	33.4	14	28	25.00
15	227	142	1	59.6	1	26.1	144.12	0.67	0.005 4210	33.9	14	24	29.09
16	228	142	59	39.1	59	5.5	144.17	-0.57	0.005 3394	-34.3	14	20	33.18
17	229	143	57	20.0	56	46.2	144.23	0.45	0.005 2567	34.7	14	16	37.27
18	230	144	55	2.2	54	28.2	144.29	0.32	0.005 1730	35.1	14	12	41.36
19	231	145	52	45.8	52	11.7	144.35	-0.20	0.005 0883	-35.5	14	8	45.45
20	232	146	50	30.9	49	56.7	144.41	-0.08	0.005 0026	35.9	14	4	49.54
21	233	147	48	17.6	47	43.3	144.48	+0.04	0.004 9158	36.4	14	0	53.63
22	234	148	46	6.0	45	31.5	144.55	+0.15	0.004 8279	-36.9	13	56	57.72
23	235	149	43	56.0	43	21.4	144.62	0.24	0.004 7388	37.4	13	53	1.81
24	236	150	41	47.7	41	13.0	144.69	0.31	0.004 6485	37.9	13	49	5.90
25	237	151	39	41.2	39	6.3	144.76	+0.36	0.004 5569	-38.5	13	45	10.00
26	238	152	37	36.5	37	1.5	144.84	0.37	0.004 4639	39.1	13	41	14.09
27	239	153	35	33.6	34	58.5	144.91	0.35	0.004 3693	39.7	13	37	18.18
28	240	154	33	32.6	32	57.3	144.99	+0.31	0.004 2731	-40.4	13	33	22.27
29	241	155	31	33.4	30	58.0	145.06	0.24	0.004 1752	41.2	13	29	26.36
30	242	156	29	36.0	29	0.5	145.14	+0.13	0.004 0755	41.9	13	25	30.45
31	243	157	27	40.3	27	4.7	145.21	0.00	0.003 9740	42.7	13	21	34.54
32	244	158	25	46.3	25	10.5	145.28	-0.13	0.003 8706	-43.5	13	17	38.63

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour.
-9^s.8296.
(Table II.)

GREENWICH MEAN TIME.

THE MOON'S								
SEMI-DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
Mon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
"	' "	' "	"	' "	"	h m	m	d
22.6	16 27.5	60 0.35	+1.628	60 18.26	+1.350	0 6	. .	28.3
31.4	16 34.2	60 32.59	1.033	60 42.96	+0.691	0 8.4	2.45	29.3
35.9	16 36.4	60 49.11	+0.333	60 50.94	−0.025	1 5.2	2.30	1.0
35.7	16 34.0	60 48.54	−0.372	60 42.10	−0.696	1 58.5	2.16	2.0
31.2	16 27.6	60 31.96	0.987	60 18.55	1.241	2 49.1	2.07	3.0
23.2	16 18.1	60 2.35	1.451	59 43.90	1.615	3 38.4	2.05	4.0
12.7	16 6.9	59 23.77	−1.733	59 2.47	−1.809	4 27.7	2.08	5.0
0.9	15 54.8	58 40.50	1.848	58 18.26	1.854	5 18.3	2.15	6.0
48.8	15 42.8	57 56.13	1.831	57 34.42	1.784	6 10.9	2.24	7.0
37.1	15 31.6	57 13.38	−1.720	56 53.20	−1.642	7 5.6	2.32	8.0
26.4	15 21.4	56 33.99	1.557	56 15.83	1.468	8 1.7	2.35	9.0
16.8	15 12.5	55 58.79	1.372	55 42.89	1.277	8 57.7	2.31	10.0
8.4	15 4.7	55 28.13	−1.183	55 14.49	−1.090	9 51.8	2.20	11.0
1.3	14 58.2	55 1.96	0.998	54 50.52	0.907	10 42.9	2.05	12.0
55.4	14 52.8	54 40.17	0.816	54 30.93	0.723	11 30.4	1.91	13.0
50.6	14 48.7	54 22.81	−0.629	54 15.82	−0.533	12 14.4	1.77	14.0
47.1	14 45.9	54 10.02	0.432	54 5.48	0.324	12 55.7	1.68	15.0
45.0	14 44.6	54 2.26	−0.211	54 0.46	−0.087	13 35.2	1.62	16.0
44.5	14 44.9	54 0.20	+0.045	54 1.57	+0.185	14 13.8	1.61	17.0
45.7	14 47.0	54 4.68	0.334	54 9.64	0.494	14 52.8	1.64	18.0
48.9	14 51.4	54 16.56	0.662	54 25.54	0.837	15 33.0	1.72	19.0
54.4	14 58.0	54 36.67	+1.018	54 50.00	+1.204	16 15.8	1.85	20.0
2.3	15 7.1	55 5.57	1.390	55 23.36	1.574	17 2.2	2.02	21.0
12.6	15 18.6	55 43.34	1.754	56 5.40	1.921	17 53.0	2.21	22.0
25.1	15 32.1	56 29.39	+2.074	56 55.08	+2.204	18 48.4	2.40	23.0
39.5	15 47.2	57 22.16	2.307	57 50.26	2.371	19 47.7	2.52	24.0
55.0	16 2.8	58 18.91	2.396	58 47.58	2.373	20 48.8	2.55	25.0
10.4	16 17.7	59 15.65	+2.296	59 42.43	+2.160	21 49.6	2.49	26.0
24.5	16 30.5	60 7.22	1.964	60 29.32	1.710	22 48.0	2.37	27.0
35.6	16 39.6	60 48.03	1.400	61 2.74	1.047	23 43.4	2.25	28.0
42.4	16 43.9	61 12.99	+0.658	61 18.44	+0.248	0 6	. .	29.0
44.0	16 42.8	61 18.90	−0.171	61 14.39	−0.578	0 36.2	2.16	0.6

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

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MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

0	5 17 0.51	2.5013	N. 28 20 49.1	2.669	0	7 21 4.71	2.6122	N. 27 0 22.4	■
1	5 19 30.76	2.5068	28 23 24.2	2.502	1	7 23 41.40	2.6108	26 54 4.6	6.
2	5 22 1.33	2.5122	28 25 49.3	2.333	2	7 26 18.01	2.6094	26 47 35.5	6.
3	5 24 32.23	2.5176	28 28 4.1	2.162	3	7 28 54.53	2.6078	26 40 55.0	6.
4	5 27 3.44	2.5228	28 30 8.7	1.991	4	7 31 30.95	2.6061	26 34 3.2	6.
5	5 29 34.96	2.5278	28 32 3.0	1.818	■	7 34 7.26	2.6043	26 27 0.2	7.
6	5 32 6.78	2.5327	28 33 46.9	1.644	6	7 36 43.46	2.6023	26 19 46.1	7.
7	5 34 38.89	2.5376	28 35 20.3	1.469	7	7 39 19.54	2.6002	26 12 20.8	7.
8	5 37 11.29	2.5423	28 36 43.2	1.294	8	7 41 55.49	2.5980	26 4 44.4	7.
9	5 39 43.96	2.5468	28 37 55.6	1.118	9	7 44 31.30	2.5956	25 56 56.9	7.
10	5 42 16.91	2.5513	28 38 57.4	0.941	10	7 47 6.96	2.5931	25 48 58.4	8.
11	5 44 50.12	2.5556	28 39 48.5	0.762	11	7 49 42.47	2.5906	25 40 48.9	8.
12	5 47 23.58	2.5598	28 40 28.8	0.583	12	7 52 17.83	2.5879	25 32 28.4	■
13	5 49 57.29	2.5638	28 40 58.4	0.402	13	7 54 53.02	2.5850	25 23 57.0	■
14	5 52 31.24	2.5677	28 41 17.1	0.221	14	7 57 28.03	2.5821	25 15 14.9	8.
15	5 55 5.42	2.5715	28 41 24.9	+0.039	15	8 0 2.87	2.5791	25 6 21.9	■
16	5 57 39.82	2.5752	28 41 21.8	-0.143	16	8 2 37.52	2.5759	24 57 18.2	9.
17	6 0 14.44	2.5787	28 41 7.7	0.327	17	8 5 11.98	2.5727	24 48 3.9	9.
18	6 2 49.26	2.5820	28 40 42.6	0.512	18	8 7 46.24	2.5693	24 38 39.0	9.
19	6 5 24.28	2.5851	28 40 6.3	0.697	19	8 10 20.30	2.5659	24 29 3.6	9.
20	6 7 59.48	2.5883	28 39 19.0	0.882	20	8 12 54.15	2.5623	24 19 17.7	9.
21	6 10 34.87	2.5913	28 38 20.5	1.068	21	8 15 27.78	2.5587	24 9 21.4	10.
22	6 13 10.43	2.5940	28 37 10.9	1.254	22	8 18 1.20	2.5551	23 59 14.8	10.
23	6 15 46.15	2.5966	28 35 50.0	1.442	23	8 20 34.39	2.5513	23 48 57.9	10.
24	6 18 22.02	2.5991	N. 28 34 17.9	1.629	24	8 23 7.35	2.5474	N. 23 38 30.9	10.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 29.					SUNDAY, 31.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	8 23 7.35	2.5474	N.23 38 30.9	10.534	0	10 20 11.96	2.3294	N.12 28 21.9	16.683
1	8 25 40.08	2.5435	23 27 53.8	10.702	1	10 22 31.60	2.3253	12 11 38.5	16.763
2	8 28 12.57	2.5394	23 17 6.6	10.869	2	10 24 50.99	2.3212	11 54 50.4	16.841
3	8 30 44.81	2.5353	23 6 9.5	11.033	3	10 27 10.14	2.3172	11 37 57.6	16.917
4	8 33 16.81	2.5312	22 55 2.6	11.197	4	10 29 29.05	2.3132	11 21 0.4	16.990
5	8 35 48.56	2.5271	22 43 45.8	11.360	5	10 31 47.73	2.3093	11 3 58.8	17.062
6	8 38 20.06	2.5228	22 32 19.4	11.520	6	10 34 6.17	2.3055	10 46 53.0	17.131
7	8 40 51.30	2.5184	22 20 43.4	11.679	7	10 36 24.39	2.3018	10 29 43.1	17.198
8	8 43 22.27	2.5140	22 8 57.9	11.837	8	10 38 42.38	2.2981	10 12 29.3	17.263
9	8 45 52.98	2.5097	21 57 2.9	11.993	9	10 41 0.16	2.2944	9 55 11.6	17.326
10	8 48 23.43	2.5053	21 44 58.7	12.148	10	10 43 17.71	2.2908	9 37 50.2	17.387
11	8 50 53.61	2.5007	21 32 45.2	12.302	11	10 45 35.05	2.2873	9 20 25.2	17.446
12	8 53 23.51	2.4961	21 20 22.5	12.453	12	10 47 52.19	2.2839	9 2 56.7	17.503
13	8 55 53.14	2.4915	21 7 50.8	12.603	13	10 50 9.12	2.2805	8 45 24.9	17.557
14	8 58 22.49	2.4868	20 55 10.1	12.752	14	10 52 25.85	2.2772	8 27 49.9	17.609
15	9 0 51.56	2.4823	20 42 20.6	12.898	15	10 54 42.38	2.2739	8 10 11.8	17.659
16	9 3 20.35	2.4775	20 29 22.4	13.043	16	10 56 58.72	2.2708	7 52 30.8	17.707
17	9 5 48.86	2.4728	20 16 15.5	13.186	17	10 59 14.87	2.2677	7 34 47.0	17.753
18	9 8 17.09	2.4681	20 3 0.1	13.328	18	11 1 30.84	2.2647	7 17 0.5	17.796
19	9 10 45.03	2.4633	19 49 36.2	13.468	19	11 3 46.63	2.2618	6 59 11.5	17.837
20	9 13 12.69	2.4586	19 36 4.0	13.605	20	11 6 2.25	2.2588	6 41 20.0	17.877
21	9 15 40.06	2.4538	19 22 23.6	13.741	21	11 8 17.69	2.2560	6 23 26.3	17.913
22	9 18 7.14	2.4489	19 8 35.1	13.876	22	11 10 32.97	2.2533	6 5 30.4	17.948
23	9 20 33.93	2.4442	N.18 54 38.5	14.008	23	11 12 48.09	2.2507	N. 5 47 32.5	17.982
SATURDAY 30.					MONDAY, SEPT. 1.				
0	9 23 0.44	2.4394	N.18 40 34.1	14.138	0	11 15 3.05	2.2481	N. 5 29 32.6	18.012
1	9 25 26.66	2.4346	18 26 21.9	14.268	PHASES OF THE MOON.				
2	9 27 52.59	2.4298	18 12 2.0	14.395					
3	9 30 18.23	2.4249	17 57 34.5	14.520					
4	9 32 43.58	2.4201	17 42 59.6	14.643					
5	9 35 8.64	2.4153	17 28 17.4	14.764					
6	9 37 33.42	2.4106	17 13 27.9	14.883					
7	9 39 57.91	2.4058	16 58 31.4	15.000					
8	9 42 22.12	2.4011	16 43 27.9	15.116					
9	9 44 46.04	2.3963	16 28 17.5	15.229					
10	9 47 9.68	2.3916	16 13 0.4	15.340					
11	9 49 33.03	2.3869	15 57 36.7	15.450					
12	9 51 56.11	2.3823	15 42 6.4	15.558					
13	9 54 18.91	2.3777	15 26 29.8	15.663					
14	9 56 41.43	2.3731	15 10 46.9	15.766					
15	9 59 3.68	2.3686	14 54 57.9	15.867					
16	10 1 25.66	2.3641	14 39 2.9	15.965					
17	10 3 47.37	2.3596	14 23 2.1	16.062					
18	10 6 8.81	2.3551	14 6 55.5	16.157					
19	10 8 29.98	2.3507	13 50 43.2	16.251					
20	10 10 50.89	2.3463	13 34 25.4	16.341					
21	10 13 11.54	2.3420	13 18 2.3	16.429					
22	10 15 31.93	2.3378	13 1 33.9	16.516					
23	10 17 52.07	2.3336	12 45 0.4	16.600					
24	10 20 11.96	2.3294	N.12 28 21.9	16.683					

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SEPTEMBER, 1913.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Added to
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		Subtracted from Apparent Time.
		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>	<div>' "</div>	<div>s</div>	<div>m s</div>
Mon.	1	10 40 14.50	9.078	N. 8 24 57.6	−54.35	15 52.97	64.38	0 4.17
Tues.	2	10 43 52.22	9.065	8 3 9.2	54.68	15 53.20	64.34	0 14.62
Wed.	3	10 47 29.64	9.053	7 41 13.0	54.99	15 53.43	64.30	0 33.71
Thur.	4	10 51 6.78	9.042	7 19 9.4	−55.29	15 53.67	64.26	0 53.08
Fri.	5	10 54 43.65	9.031	6 56 58.8	55.58	15 53.91	64.22	1 12.71
Sat.	6	10 58 20.27	9.021	6 34 41.6	55.85	15 54.16	64.19	1 32.59
SUN.	7	11 1 56.65	9.012	6 12 18.1	−56.11	15 54.41	64.16	1 52.70
Mon.	8	11 5 32.82	9.003	5 49 48.5	56.35	15 54.66	64.13	2 13.03
Tues.	9	11 9 8.80	8.995	5 27 13.2	56.58	15 54.91	64.11	2 33.55
Wed.	10	11 12 44.60	8.988	5 4 32.5	−56.80	15 55.16	64.09	2 54.25
Thur.	11	11 16 20.24	8.982	4 41 46.8	57.00	15 55.42	64.07	3 15.10
Fri.	12	11 19 55.75	8.977	4 18 56.3	57.19	15 55.67	64.05	3 36.09
Sat.	13	11 23 31.15	8.973	3 56 1.3	−57.37	15 55.93	64.04	3 57.19
SUN.	14	11 27 6.46	8.970	3 33 2.2	57.54	15 56.19	64.03	4 18.38
Mon.	15	11 30 41.70	8.968	3 9 59.3	57.69	15 56.45	64.02	4 39.63
Tues.	16	11 34 16.90	8.966	2 46 52.8	−57.83	15 56.71	64.01	5 0.92
Wed.	17	11 37 52.08	8.966	2 23 43.1	57.96	15 56.96	64.01	5 22.23
Thur.	18	11 41 27.27	8.967	2 0 30.5	58.08	15 57.22	64.01	5 43.55
Fri.	19	11 45 2.47	8.968	1 37 15.3	−58.18	15 57.48	64.02	6 4.84
Sat.	20	11 48 37.72	8.970	1 13 57.8	58.27	15 57.74	64.03	6 26.08
SUN.	21	11 52 13.05	8.973	0 50 38.4	58.35	15 58.00	64.04	6 47.25
Mon.	22	11 55 48.47	8.978	0 27 17.3	−58.41	15 58.26	64.05	7 8.33
Tues.	23	11 59 24.00	8.983	N. 0 3 54.8	58.46	15 58.53	64.07	7 29.30
Wed.	24	12 2 59.66	8.989	S. 0 19 28.7	58.49	15 58.79	64.09	7 50.13
Thur.	25	12 6 35.48	8.996	0 42 52.8	−58.50	15 59.06	64.11	8 10.81
Fri.	26	12 10 11.48	9.004	1 6 17.2	58.51	15 59.33	64.13	8 31.31
Sat.	27	12 13 47.67	9.012	1 29 41.5	58.50	15 59.60	64.16	8 51.62
SUN.	28	12 17 24.07	9.022	1 53 5.4	−58.48	15 59.87	64.19	9 11.72
Mon.	29	12 21 0.70	9.032	2 16 28.5	58.44	16 0.14	64.22	9 31.59
Tues.	30	12 24 37.58	9.042	2 39 50.4	58.38	16 0.41	64.26	9 51.21
Wed.	31	12 28 14.72	9.053	S. 3 3 10.7	−58.31	16 0.69	64.30	10 10.56

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.18 from sidereal time.
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing and south declinations increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.		
		h m s	s	° ' "	"	m s	s	h m s
Mon.	1	10 40 14.50	9.080	N. 8 24 57.4	−54.36	0 4.16	0.777	10 40 10.33
Tues.	2	10 43 52.26	9.067	8 3 8.8	54.69	0 14.63	0.789	10 44 6.89
Wed.	3	10 47 29.73	9.055	7 41 12.4	55.00	0 33.72	0.801	10 48 3.44
Thur.	4	10 51 6.91	9.044	7 19 8.6	−55.30	0 53.09	0.813	10 52 0.00
Fri.	5	10 54 43.83	9.033	6 56 57.7	55.59	1 12.72	0.823	10 55 56.55
Sat.	6	10 58 20.50	9.023	6 34 40.2	55.86	1 32.61	0.833	10 59 53.10
SUN.	7	11 1 56.93	9.014	6 12 16.3	−56.12	1 52.73	0.843	11 3 49.66
Mon.	8	11 5 33.15	9.005	5 49 46.4	56.37	2 13.06	0.851	11 7 46.21
Tues.	9	11 9 9.18	8.997	5 27 10.8	56.60	2 33.59	0.859	11 11 42.77
Wed.	10	11 12 45.03	8.990	5 4 29.8	−56.82	2 54.29	0.866	11 15 39.32
Thur.	11	11 16 20.72	8.984	4 41 43.7	57.02	3 15.15	0.872	11 19 35.87
Fri.	12	11 19 56.28	8.979	4 18 52.9	57.21	3 36.14	0.877	11 23 32.43
Sat.	13	11 23 31.73	8.975	3 55 57.6	−57.39	3 57.24	0.881	11 27 28.98
SUN.	14	11 27 7.10	8.972	3 32 58.1	57.56	4 18.43	0.884	11 31 25.54
Mon.	15	11 30 42.40	8.970	3 9 54.8	57.71	4 39.69	0.887	11 35 22.09
Tues.	16	11 34 17.65	8.968	2 46 48.0	−57.85	5 0.99	0.888	11 39 18.64
Wed.	17	11 37 52.88	8.968	2 23 38.0	57.98	5 22.31	0.888	11 43 15.20
Thur.	18	11 41 28.12	8.969	2 0 25.0	58.10	5 43.63	0.888	11 47 11.75
Fri.	19	11 45 3.38	8.971	1 37 9.5	−58.20	6 4.93	0.886	11 51 8.30
Sat.	20	11 48 38.68	8.973	1 13 51.6	58.29	6 26.17	0.884	11 55 4.86
SUN.	21	11 52 14.06	8.976	0 50 31.8	58.36	6 47.35	0.880	11 59 1.41
Mon.	22	11 55 49.53	8.980	0 27 10.3	−58.42	7 8.44	0.876	12 2 57.97
Tues.	23	11 59 25.11	8.985	N. 0 3 47.5	58.47	7 29.41	0.871	12 6 54.52
Wed.	24	12 3 0.83	8.991	S. 0 19 36.3	58.50	7 50.25	0.865	12 10 51.07
Thur.	25	12 6 36.70	8.998	0 43 0.8	−58.52	8 10.93	0.858	12 14 47.63
Fri.	26	12 10 12.75	9.006	1 6 25.5	58.53	8 31.43	0.850	12 18 44.18
Sat.	27	12 13 48.99	9.014	1 29 50.2	58.52	8 51.74	0.842	12 22 40.73
SUN.	28	12 17 25.45	9.024	1 53 14.4	−58.49	9 11.84	0.833	12 26 37.29
Mon.	29	12 21 2.13	9.034	2 16 37.8	58.45	9 31.71	0.823	12 30 33.84
Tues.	30	12 24 39.06	9.044	2 40 0.0	58.39	9 51.34	0.812	12 34 30.40
Wed.	31	12 28 16.25	9.055	S. 3 3 20.6	−58.32	10 10.70	0.801	12 38 26.95

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign − prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.

Diff. for 1 Hour.
+9^s.8565.
(Table III.)

AT GREENWICH MEAN NOON.													
Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.			
		True Longitude.			Diff. for 1 Hour.	Latitude.							
		λ											
		°	'	''	'	''	''	''			h	m	s
1	244	158	25	46.3	25	10.5	145.28	-0.13	0.003 8706	-43.5	13	17	38.63
2	245	159	23	53.9	23	18.0	145.35	0.27	0.003 7653	44.2	13	13	42.72
3	246	160	22	3.0	21	27.0	145.41	0.40	0.003 6582	44.9	13	9	46.82
4	247	161	20	13.6	19	37.5	145.47	-0.53	0.003 5495	-45.6	13	5	50.91
5	248	162	18	25.8	17	49.5	145.54	0.63	0.003 4393	46.2	13	1	55.00
6	249	163	16	39.4	16	3.0	145.60	0.71	0.003 3277	46.7	12	57	59.09
7	250	164	14	54.4	14	17.9	145.66	-0.76	0.003 2150	-47.2	12	54	3.18
8	251	165	13	10.9	12	34.4	145.72	0.78	0.003 1013	47.6	12	50	7.28
9	252	166	11	29.0	10	52.3	145.78	0.77	0.002 9867	47.9	12	46	11.37
10	253	167	9	48.6	9	11.7	145.85	-0.73	0.002 8715	-48.1	12	42	15.46
11	254	168	8	9.8	7	32.8	145.92	0.66	0.002 7557	48.3	12	38	19.55
12	255	169	6	32.6	5	55.5	145.99	0.57	0.002 6394	48.5	12	34	23.64
13	256	170	4	57.1	4	19.9	146.06	-0.45	0.002 5228	-48.7	12	30	27.74
14	257	171	3	23.4	2	46.2	146.13	0.33	0.002 4058	48.8	12	26	31.83
15	258	172	1	51.6	1	14.2	146.21	0.21	0.002 2886	48.9	12	22	35.92
16	259	172	60	21.6	59	44.1	146.29	-0.09	0.002 1711	-49.0	12	18	40.01
17	260	173	58	53.6	58	16.0	146.37	+0.03	0.002 0535	49.1	12	14	44.11
18	261	174	57	27.6	56	49.9	146.46	0.15	0.001 9358	49.1	12	10	48.20
19	262	175	56	3.7	55	25.9	146.55	+0.26	0.001 8178	-49.2	12	6	52.29
20	263	176	54	41.9	54	4.0	146.64	0.35	0.001 6996	49.3	12	2	56.38
21	264	177	53	22.3	52	44.3	146.73	0.40	0.001 5812	49.4	11	59	0.47
22	265	178	52	4.9	51	26.8	146.82	+0.42	0.001 4625	-49.5	11	55	4.57
23	266	179	50	49.8	50	11.6	146.91	0.41	0.001 3434	49.7	11	51	8.66
24	267	180	49	37.0	48	58.6	147.01	0.38	0.001 2239	49.9	11	47	12.75
25	268	181	48	26.4	47	47.9	147.10	+0.31	0.001 1038	-50.2	11	43	16.84
26	269	182	47	18.1	46	39.5	147.20	0.21	0.000 9831	50.5	11	39	20.93
27	270	183	46	12.1	45	33.4	147.30	+0.09	0.000 8616	50.8	11	35	25.03
28	271	184	45	8.3	44	29.4	147.39	-0.04	0.000 7392	-51.2	11	31	29.12
29	272	185	44	6.6	43	27.6	147.48	0.18	0.000 6159	51.6	11	27	33.21
30	273	186	43	7.0	42	27.9	147.56	0.33	0.000 4917	52.0	11	23	37.30
31	274	187	42	9.4	41	30.2	147.64	-0.46	0.000 3666	-52.4	11	19	41.40

NORM.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
-9^s.8396.
(Table II.)



Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' ''	' ''	' ''	''	' ''	''	h m	m	d
1	16 44.0	16 42.8	61 18.90	−0.171	61 14.39	−0.578	0 36.2	2.16	0.6
2	16 40.3	16 36.6	61 5.13	0.958	60 51.53	1.302	1 27.3	2.12	1.6
3	16 31.8	16 26.2	60 34.08	1.598	60 13.39	1.840	2 18.2	2.14	2.6
4	16 19.8	16 13.0	59 50.12	−2.029	59 24.96	−2.156	3 10.1	2.20	3.6
5	16 5.8	15 58.4	58 58.60	2.230	58 31.64	2.254	4 3.7	2.27	4.6
6	15 51.1	15 43.8	58 4.66	2.236	57 38.13	2.181	4 59.2	2.35	5.6
7	15 36.8	15 30.2	57 12.44	−2.095	56 47.94	−1.984	5 56.1	2.38	6.6
8	15 23.9	15 18.0	56 24.87	1.856	56 3.41	1.716	6 52.9	2.34	7.6
9	15 12.6	15 7.7	55 43.66	1.571	55 25.69	1.422	7 48.0	2.24	8.6
10	15 3.3	14 59.4	55 9.52	−1.271	54 55.16	−1.121	8 39.9	2.09	9.6
11	14 56.0	14 53.0	54 42.57	0.977	54 31.69	0.837	9 28.3	1.94	10.6
12	14 50.5	14 48.4	54 22.46	0.702	54 14.81	0.574	10 13.0	1.80	11.6
13	14 46.8	14 45.5	54 8.65	−0.453	54 3.92	−0.336	10 54.9	1.70	12.6
14	14 44.6	14 44.0	54 0.57	0.223	53 58.57	−0.112	11 34.8	1.63	13.6
15	14 43.8	14 44.0	53 57.88	−0.003	53 58.49	+0.106	12 13.6	1.61	14.6
16	14 44.5	14 45.4	54 0.42	+0.217	54 3.69	+0.329	12 52.4	1.63	15.6
17	14 46.7	14 48.3	54 8.33	0.444	54 14.38	0.565	13 32.2	1.69	16.6
18	14 50.4	14 52.9	54 21.92	0.692	54 31.03	0.826	14 14.0	1.80	17.6
19	14 55.8	14 59.2	54 41.76	+0.964	54 54.19	+1.107	14 58.8	1.94	18.6
20	15 3.0	15 7.4	55 8.37	1.256	55 24.34	1.406	15 47.3	2.11	19.6
21	15 12.2	15 17.6	55 42.12	1.556	56 1.69	1.704	16 40.0	2.28	20.6
22	15 23.4	15 29.6	56 22.99	+1.845	56 45.90	+1.973	17 36.3	2.41	21.6
23	15 36.3	15 43.3	57 10.27	2.086	57 35.87	2.176	18 35.0	2.46	22.6
24	15 50.5	15 57.8	58 2.37	2.235	58 29.35	2.258	19 34.0	2.44	23.6
25	16 5.2	16 12.4	58 56.37	+2.239	59 22.87	+2.169	20 31.7	2.36	24.6
26	16 19.3	16 25.7	59 48.20	2.044	60 11.71	1.864	21 27.0	2.25	25.6
27	16 31.4	16 36.3	60 32.71	1.627	60 50.54	1.335	22 20.1	2.18	26.6
28	16 40.1	16 42.7	61 4.55	+0.992	61 14.21	+0.612	23 11.8	2.14	27.6
29	16 44.1	16 44.1	61 19.13	+0.206	61 19.10	−0.212	0	.	28.6
30	16 42.7	16 40.0	61 14.06	−0.626	61 4.15	1.022	0 3.2	2.15	0.3
31	16 36.1	16 31.0	60 49.69	1.382	60 31.16	1.698	0 55.6	2.22	1.3
32	16 25.0	16 18.3	60 9.18	−1.958	59 44.43	−2.159	1 49.9	2.31	2.3

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.				Diff. for 1 Min.	Declination.				Diff. for 1 Min.	Hour.	Right Ascension.				Diff. for 1 Min.	Declination.				Diff. for 1 Min.
SATURDAY 13.										MONDAY 15.										
h	m	s			°	'	"			h	m	s			°	'	"			
22	4	11.26	1.8537	S.	14	20	54.6	12.646	0	23	29	47.61	1.7376	S.	3	30	30.7	14.140		
22	6	2.36	1.8498		14	8	14.3	12.697	1	23	31	31.84	1.7367		3	16	21.9	14.152		
22	7	53.23	1.8460		13	55	30.9	12.748	2	23	33	16.01	1.7358		3	2	12.5	14.163		
22	9	43.88	1.8422		13	42	44.5	12.797	3	23	35	0.14	1.7352		2	48	2.4	14.173		
22	11	34.30	1.8383		13	29	55.2	12.845	4	23	36	44.23	1.7345		2	33	51.7	14.182		
22	13	24.50	1.8349		13	17	3.1	12.892	5	23	38	28.28	1.7339		2	19	40.5	14.191		
22	15	14.49	1.8313		13	4	8.2	12.938	6	23	40	12.30	1.7334		2	5	28.8	14.199		
22	17	4.26	1.8278		12	51	10.5	12.984	7	23	41	56.29	1.7329		1	51	16.6	14.207		
22	18	53.83	1.8244		12	38	10.1	13.029	8	23	43	40.25	1.7326		1	37	4.0	14.213		
22	20	43.19	1.8210		12	25	7.0	13.072	9	23	45	24.20	1.7323		1	22	51.1	14.218		
22	22	32.35	1.8177		12	12	1.4	13.115	10	23	47	8.13	1.7320		1	8	37.8	14.223		
22	24	21.31	1.8143		11	58	53.2	13.157	11	23	48	52.04	1.7318		0	54	24.3	14.227		
22	26	10.07	1.8111		11	45	42.5	13.198	12	23	50	35.95	1.7317		0	40	10.6	14.230		
22	27	58.64	1.8080		11	32	29.4	13.238	13	23	52	19.85	1.7317		0	25	56.7	14.232		
22	29	47.03	1.8049		11	19	13.9	13.278	14	23	54	3.75	1.7317	S.	0	11	42.7	14.234		
22	31	35.23	1.8019		11	5	56.0	13.317	15	23	55	47.65	1.7317	N.	0	2	31.4	14.236		
22	33	23.25	1.7990		10	52	35.8	13.355	16	23	57	31.56	1.7319		0	16	45.6	14.237		
22	35	11.11	1.7960		10	39	13.4	13.392	17	23	59	15.48	1.7322		0	30	59.8	14.237		
22	36	58.78	1.7931		10	25	48.8	13.428	18	0	0	59.42	1.7325		0	45	14.0	14.235		
22	38	46.28	1.7903		10	12	22.0	13.464	19	0	2	43.38	1.7328		0	59	28.0	14.233		
22	40	33.62	1.7877		9	58	53.1	13.498	20	0	4	27.36	1.7332		1	13	41.9	14.230		
22	42	20.80	1.7850		9	45	22.2	13.532	21	0	6	11.36	1.7337		1	27	55.6	14.227		
22	44	7.82	1.7823		9	31	49.3	13.565	22	0	7	55.40	1.7343		1	42	9.1	14.223		
22	45	54.68	1.7798	S.	9	18	14.4	13.597	23	0	9	39.47	1.7349	N.	1	56	22.4	14.218		
SUNDAY 14.										TUESDAY 16.										
22	47	41.40	1.7774	S.	9	4	37.6	13.628	0	0	11	23.59	1.7357	N.	2	10	35.3	14.213		
22	49	27.97	1.7750		8	50	59.0	13.658	1	0	13	7.75	1.7363		2	24	47.9	14.207		
22	51	14.40	1.7727		8	37	18.6	13.687	2	0	14	51.95	1.7371		2	39	0.1	14.199		
22	53	0.69	1.7703		8	23	36.5	13.716	3	0	16	36.20	1.7380		2	53	11.8	14.191		
22	54	46.84	1.7682		8	9	52.7	13.744	4	0	18	20.51	1.7390		3	7	23.0	14.182		
22	56	32.87	1.7661		7	56	7.2	13.772	5	0	20	4.88	1.7401		3	21	33.7	14.173		
22	58	18.77	1.7639		7	42	20.1	13.798	6	0	21	49.32	1.7412		3	35	43.8	14.163		
23	0	4.54	1.7618		7	28	31.4	13.824	7	0	23	33.82	1.7423		3	49	53.2	14.152		
23	1	50.19	1.7599		7	14	41.2	13.848	8	0	25	18.39	1.7435		4	4	2.0	14.140		
23	3	35.73	1.7580		7	0	49.6	13.872	9	0	27	3.04	1.7448		4	18	10.0	14.127		
23	5	21.15	1.7562		6	46	56.5	13.896	10	0	28	47.77	1.7462		4	32	17.3	14.114		
23	7	6.47	1.7545		6	33	2.1	13.918	11	0	30	32.58	1.7476		4	46	23.7	14.100		
23	8	51.69	1.7528		6	19	6.3	13.940	12	0	32	17.48	1.7491		5	0	29.3	14.086		
23	10	36.81	1.7512		6	5	9.3	13.961	13	0	34	2.47	1.7507		5	14	34.0	14.070		
23	12	21.83	1.7496		5	51	11.0	13.982	14	0	35	47.56	1.7523		5	28	37.7	14.053		
23	14	6.76	1.7481		5	37	11.5	14.001	15	0	37	32.75	1.7540		5	42	40.4	14.036		
23	15	51.60	1.7466		5	23	10.9	14.019	16	0	39	18.04	1.7557		5	56	42.0	14.018		
23	17	36.35	1.7452		5	9	9.2	14.037	17	0	41	3.43	1.7575		6	10	42.6	14.000		
23	19	21.02	1.7439		4	55	6.5	14.053	18	0	42	48.94	1.7593		6	24	42.0	13.980		
23	21	5.62	1.7427		4	41	2.8	14.070	19	0	44	34.57	1.7614		6	38	40.2	13.960		
23	22	50.15	1.7416		4	26	58.1	14.086	20	0	46	20.31	1.7634		6	52	37.2	13.939		
23	24	34.61	1.7404		4	12	52.5	14.101	21	0	48	6.18	1.7656		7	6	32.9	13.917		
23	26	19.00	1.7393		3	58	46.0	14.115	22	0	49	52.18	1.7678		7	20	27.2	13.894		
23	28	3.33	1.7384		3	44	38.7	14.128	23	0	51	38.31	1.7700		7	34	20.2	13.871		
23	29	47.61	1.7376	S.	3	30	30.7	14.140	24	0	53	24.58	1.7723	N.	7	48	11.7	13.846		

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY, 29.					WEDNESDAY, OCTOBER 1.				
0	11 44 0.23	2.2293	N. 1 34 29.9	18.283	0	13 32 3.80	2.3012	S. 12 37 30.7	16.426
1	11 46 13.98	2.2290	1 16 12.6	18.293					
2	11 48 27.71	2.2288	0 57 54.8	18.301					
3	11 50 41.43	2.2287	0 39 36.5	18.307					
4	11 52 55.15	2.2286	0 21 18.0	18.310					
5	11 55 8.86	2.2286	N. 0 2 59.3	18.312					
6	11 57 22.58	2.2287	S. 0 15 19.5	18.312					
7	11 59 36.31	2.2289	0 33 38.2	18.310					
8	12 1 50.05	2.2292	0 51 56.7	18.306					
9	12 4 3.81	2.2295	1 10 14.9	18.299					
10	12 6 17.59	2.2299	1 28 32.6	18.290					
11	12 8 31.40	2.2304	1 46 49.7	18.279					
12	12 10 45.24	2.2310	2 5 6.1	18.267					
13	12 12 59.12	2.2317	2 23 21.7	18.252					
14	12 15 13.04	2.2324	2 41 36.3	18.234					
15	12 17 27.01	2.2332	2 59 49.8	18.215					
16	12 19 41.03	2.2342	3 18 2.1	18.194					
17	12 21 55.11	2.2352	3 36 13.1	18.171					
18	12 24 9.25	2.2362	3 54 22.6	18.145					
19	12 26 23.45	2.2373	4 12 30.5	18.117					
20	12 28 37.72	2.2385	4 30 36.7	18.088					
21	12 30 52.07	2.2398	4 48 41.1	18.057					
22	12 33 6.50	2.2412	5 6 43.5	18.022					
23	12 35 21.01	2.2427	S. 5 24 43.8	17.986					
TUESDAY 30.					PHASES OF THE MOON.				
0	12 37 35.62	2.2442	S. 5 42 41.8	17.948					
1	12 39 50.32	2.2457	6 0 37.5	17.908					
2	12 42 5.11	2.2474	6 18 30.8	17.867					
3	12 44 20.01	2.2492	6 36 21.5	17.822					
4	12 46 35.01	2.2510	6 54 9.4	17.775					
5	12 48 50.13	2.2529	7 11 54.5	17.727					
6	12 51 5.36	2.2548	7 29 36.7	17.677					
7	12 53 20.71	2.2568	7 47 15.8	17.624					
8	12 55 36.18	2.2589	8 4 51.6	17.570					
9	12 57 51.78	2.2612	8 22 24.2	17.514					
10	13 0 7.52	2.2634	8 39 53.3	17.455					
11	13 2 23.39	2.2657	8 57 18.8	17.394					
12	13 4 39.40	2.2681	9 14 40.6	17.332					
13	13 6 55.56	2.2705	9 31 58.6	17.268					
14	13 9 11.86	2.2729	9 49 12.7	17.201					
15	13 11 28.31	2.2755	10 6 22.7	17.132					
16	13 13 44.92	2.2782	10 23 28.5	17.061					
17	13 16 1.69	2.2808	10 40 30.0	16.989					
18	13 18 18.62	2.2835	10 57 27.2	16.915					
19	13 20 35.71	2.2863	11 14 19.8	16.838					
20	13 22 52.98	2.2892	11 31 7.7	16.759					
21	13 25 10.42	2.2921	11 47 50.9	16.679					
22	13 27 28.03	2.2950	12 4 29.2	16.597					
23	13 29 45.82	2.2981	12 21 2.5	16.513					
24	13 32 3.80	2.3012	S. 12 37 30.7	16.426					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.				
		h m s	s	° ' "	"	' "	s	m s	s	
Wed.	1	12 28 14.72	9.053	S. 3 3 10.7	-58.31	16 0.69	64.30	10 10.56	0.801	
Thur.	2	12 31 52.14	9.065	3 26 29.0	58.22	16 0.97	64.34	10 29.64	0.789	
Fri.	3	12 35 29.85	9.078	3 49 44.9	58.11	16 1.25	64.39	10 48.44	0.777	
Sat.	4	12 39 7.87	9.091	4 12 58.1	-57.99	16 1.53	64.44	11 6.92	0.763	
SUN.	5	12 42 46.21	9.105	4 36 8.2	57.85	16 1.81	64.49	11 25.08	0.749	
Mon.	6	12 46 24.90	9.120	4 59 14.7	57.69	16 2.10	64.54	11 42.89	0.735	
Tues.	7	12 50 3.96	9.136	5 22 17.4	-57.52	16 2.38	64.60	12 0.34	0.719	
Wed.	8	12 53 43.41	9.152	5 45 15.8	57.34	16 2.67	64.66	12 17.40	0.702	
Thur.	9	12 57 23.27	9.169	6 8 9.8	57.14	16 2.95	64.73	12 34.05	0.685	
Fri.	10	13 1 3.55	9.188	6 30 58.7	-56.93	16 3.23	64.80	12 50.27	0.667	
Sat.	11	13 4 44.28	9.207	6 53 42.4	56.70	16 3.51	64.87	13 6.05	0.648	
SUN.	12	13 8 25.48	9.227	7 16 20.4	56.46	16 3.79	64.94	13 21.36	0.628	
Mon.	13	13 12 7.18	9.248	7 38 52.5	-56.20	16 4.07	65.02	13 36.18	0.607	
Tues.	14	13 15 49.39	9.270	8 1 18.2	55.93	16 4.35	65.10	13 50.49	0.585	
Wed.	15	13 19 32.13	9.292	8 23 37.2	55.64	16 4.62	65.18	14 4.27	0.562	
Thur.	16	13 23 15.42	9.316	8 45 49.3	-55.34	16 4.89	65.26	14 17.49	0.539	
Fri.	17	13 26 59.29	9.340	9 7 53.9	55.03	16 5.16	65.34	14 30.14	0.514	
Sat.	18	13 30 43.76	9.365	9 29 50.7	54.70	16 5.43	65.43	14 42.19	0.489	
SUN.	19	13 34 28.85	9.392	9 51 39.4	-54.35	16 5.70	65.52	14 53.63	0.463	
Mon.	20	13 38 14.57	9.419	10 13 19.6	53.99	16 5.97	65.61	15 4.43	0.436	
Tues.	21	13 42 0.95	9.447	10 34 50.9	53.61	16 6.23	65.70	15 14.58	0.409	
Wed.	22	13 45 48.00	9.475	10 56 12.8	-53.21	16 6.49	65.80	15 24.06	0.380	
Thur.	23	13 49 35.74	9.504	11 17 25.1	52.80	16 6.75	65.90	15 32.85	0.351	
Fri.	24	13 53 24.19	9.534	11 38 27.4	52.38	16 7.01	66.00	15 40.93	0.322	
Sat.	25	13 57 13.35	9.564	11 59 19.3	-51.93	16 7.27	66.10	15 48.30	0.292	
SUN.	26	14 1 3.25	9.595	12 20 0.3	51.47	16 7.53	66.20	15 54.94	0.261	
Mon.	27	14 4 53.90	9.626	12 40 29.9	50.99	16 7.78	66.31	16 0.84	0.230	
Tues.	28	14 8 45.30	9.657	13 0 47.7	-50.49	16 8.04	66.42	16 5.98	0.198	
Wed.	29	14 12 37.46	9.689	13 20 53.4	49.97	16 8.30	66.53	16 10.36	0.166	
Thur.	30	14 16 30.38	9.721	13 40 46.5	49.44	16 8.56	66.64	16 13.98	0.134	
Fri.	31	14 20 24.08	9.754	14 0 26.6	48.89	16 8.81	66.75	16 16.83	0.102	
Sat.	32	14 24 18.56	9.786	S. 14 19 53.2	-48.32	16 9.07	66.86	16 18.90	0.070	

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0'.18 from the sidereal time.
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Wed.	1	12 28 16.25	9.055	S. 3 3 20.6	−58.32	10 10.70	0.801	12 38 26.95
Thur.	2	12 31 53.72	9.067	3 26 39.2	58.23	10 29.78	0.789	12 42 23.50
Fri.	3	12 35 31.48	9.080	3 49 55.4	58.12	10 48.57	0.777	12 46 20.06
Sat.	4	12 39 9.55	9.093	4 13 8.9	−58.00	11 7.06	0.763	12 50 16.61
SUN.	5	12 42 47.94	9.107	4 36 19.2	57.86	11 25.22	0.749	12 54 13.16
Mon.	6	12 46 26.68	9.122	4 59 26.0	57.70	11 43.03	0.735	12 58 9.72
Tues.	7	12 50 5.79	9.138	5 22 28.9	−57.53	12 0.48	0.719	13 2 6.27
Wed.	8	12 53 45.29	9.154	5 45 27.6	57.35	12 17.54	0.702	13 6 2.83
Thur.	9	12 57 25.19	9.171	6 8 21.7	57.15	12 34.19	0.685	13 9 59.38
Fri.	10	13 1 5.52	9.190	6 31 10.9	−56.94	12 50.41	0.667	13 13 55.93
Sat.	11	13 4 46.29	9.209	6 53 54.8	56.71	13 6.19	0.648	13 17 52.49
SUN.	12	13 8 27.54	9.229	7 16 33.0	56.47	13 21.50	0.628	13 21 49.04
Mon.	13	13 12 9.28	9.250	7 39 5.3	−56.21	13 36.32	0.607	13 25 45.60
Tues.	14	13 15 51.53	9.272	8 1 31.2	55.94	13 50.63	0.585	13 29 42.15
Wed.	15	13 19 34.31	9.294	8 23 50.4	55.65	14 4.40	0.562	13 33 38.71
Thur.	16	13 23 17.64	9.318	8 46 2.5	−55.35	14 17.62	0.539	13 37 35.26
Fri.	17	13 27 1.55	9.342	9 8 7.2	55.03	14 30.26	0.514	13 41 31.81
Sat.	18	13 30 46.06	9.367	9 30 4.1	54.70	14 42.31	0.489	13 45 28.37
SUN.	19	13 34 31.18	9.393	9 51 52.8	−54.35	14 53.74	0.463	13 49 24.92
Mon.	20	13 38 16.94	9.420	10 13 33.1	53.99	15 4.54	0.436	13 53 21.48
Tues.	21	13 42 3.35	9.448	10 35 4.4	53.61	15 14.69	0.409	13 57 18.03
Wed.	22	13 45 50.43	9.476	10 56 26.4	−53.22	15 24.16	0.380	14 1 14.59
Thur.	23	13 49 38.20	9.505	11 17 38.8	52.81	15 32.94	0.351	14 5 11.14
Fri.	24	13 53 26.68	9.535	11 38 41.1	52.38	15 41.02	0.322	14 9 7.70
Sat.	25	13 57 15.87	9.565	11 59 33.0	−51.93	15 48.38	0.292	14 13 4.25
SUN.	26	14 1 5.80	9.596	12 20 13.9	51.47	15 55.01	0.261	14 17 0.81
Mon.	27	14 4 56.47	9.627	12 40 43.5	50.99	16 0.90	0.230	14 20 57.36
Tues.	28	14 8 47.89	9.658	13 1 1.4	−50.49	16 6.03	0.198	14 24 53.92
Wed.	29	14 12 40.07	9.690	13 21 7.0	49.97	16 10.41	0.166	14 28 50.47
Thur.	30	14 16 33.01	9.722	13 40 59.9	49.43	16 14.02	0.134	14 32 47.03
Fri.	31	14 20 26.73	9.754	14 0 39.8	48.88	16 16.86	0.102	14 36 43.58
Sat.	32	14 24 21.23	9.787	S. 14 20 6.3	−48.31	16 18.92	0.070	14 40 40.14

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign − prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,
+9^s.8565.
(Table III.)



GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	16 36.1	16 31.0	60 49.69	−1.382	60 31.16	−1.698	0 55.6	2.22	1.3
2	16 25.0	16 18.3	60 9.18	1.958	59 44.43	2.159	1 49.9	2.31	2.3
3	16 11.0	16 3.3	59 17.61	2.300	58 49.46	2.381	2 46.6	2.41	3.3
4	15 55.5	15 47.6	58 20.66	−2.411	57 51.82	−2.387	3 45.1	2.46	4.3
5	15 39.9	15 32.5	57 23.53	2.320	56 56.27	2.219	4 44.0	2.43	5.3
6	15 25.4	15 18.8	56 30.40	2.088	56 6.25	1.935	5 41.2	2.32	6.3
7	15 12.8	15 7.3	55 44.04	−1.765	55 23.93	−1.584	6 35.2	2.17	7.3
8	15 2.4	14 58.1	55 6.03	1.397	54 50.38	1.209	7 25.2	2.00	8.3
9	14 54.5	14 51.5	54 37.00	1.021	54 25.86	0.837	8 11.2	1.84	9.3
10	14 49.0	14 47.1	54 16.89	−0.659	54 10.01	−0.490	8 53.8	1.72	10.3
11	14 45.8	14 45.0	54 5.10	0.330	54 2.04	−0.179	9 34.2	1.65	11.3
12	14 44.6	14 44.7	54 0.73	−0.038	54 1.07	+0.094	10 13.2	1.61	12.3
13	14 45.2	14 46.1	54 2.94	+0.215	54 6.20	+0.326	10 52.0	1.62	13.3
14	14 47.3	14 48.9	54 10.74	0.428	54 16.48	0.526	11 31.5	1.68	14.3
15	14 50.8	14 53.0	54 23.37	0.620	54 31.36	0.710	12 12.8	1.77	15.3
16	14 55.4	14 58.2	54 40.40	+0.796	54 50.46	+0.881	12 56.9	1.91	16.3
17	15 1.2	15 4.5	55 1.56	0.968	55 13.71	1.056	13 44.5	2.06	17.3
18	15 8.1	15 12.0	55 26.92	1.145	55 41.20	1.236	14 35.9	2.22	18.3
19	15 16.2	15 20.7	55 56.59	+1.328	56 13.09	+1.421	15 30.8	2.34	19.3
20	15 25.5	15 30.6	56 30.69	1.513	56 49.37	1.599	16 27.9	2.40	20.3
21	15 35.9	15 41.5	57 9.04	1.679	57 29.60	1.747	17 25.4	2.38	21.3
22	15 47.3	15 53.3	57 50.90	+1.800	58 12.71	+1.832	18 21.8	2.31	22.3
23	15 59.3	16 5.3	58 34.75	1.837	58 56.68	1.811	19 16.0	2.21	23.3
24	16 11.1	16 16.6	59 18.08	1.748	59 38.47	1.642	20 7.9	2.12	24.3
25	16 21.8	16 26.4	59 57.32	+1.490	60 14.05	+1.294	20 58.3	2.09	25.3
26	16 30.2	16 33.2	60 28.18	1.055	60 39.21	0.772	21 48.4	2.10	26.3
27	16 35.2	16 36.2	60 46.56	+0.452	60 49.95	+0.108	22 39.4	2.16	27.3
28	16 35.9	16 34.5	60 49.11	−0.250	60 43.93	−0.613	23 32.5	2.28	28.3
29	16 31.9	16 28.2	60 34.45	0.964	60 20.89	1.291	6	.	29.3
30	16 23.5	16 17.9	60 3.60	1.582	59 43.09	1.829	0 28.7	2.41	0.9
31	16 11.6	16 4.7	59 19.88	2.030	58 54.60	2.174	1 27.7	2.50	1.9
32	15 57.4	15 50.0	58 27.94	−2.262	58 0.51	−2.301	2 28.3	2.53	2.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 1.					FRIDAY 3.				
0	13 32 3.80	2.3012	S.12 37 30.7	16.426	0	15 26 34.53	2.4705	S.23 33 28.4	10.313
1	13 34 21.96	2.3043	12 53 53.6	16.337	1	15 29 2.85	2.4736	23 43 42.3	10.152
2	13 36 40.31	2.3074	13 10 11.2	16.248	2	15 31 31.36	2.4766	23 53 46.6	9.990
3	13 38 58.85	2.3107	13 26 23.4	16.157	3	15 34 0.04	2.4795	24 3 41.1	9.827
4	13 41 17.59	2.3139	13 42 30.0	16.063	4	15 36 28.90	2.4824	24 13 25.8	9.663
5	13 43 36.52	2.3172	13 58 30.9	15.967	5	15 38 57.93	2.4852	24 23 0.7	9.498
6	13 45 55.66	2.3206	14 14 26.0	15.869	6	15 41 27.12	2.4878	24 32 25.6	9.332
7	13 48 14.99	2.3239	14 30 15.2	15.770	7	15 43 56.47	2.4905	24 41 40.5	9.165
8	13 50 34.53	2.3273	14 45 58.4	15.669	8	15 46 25.98	2.4931	24 50 45.4	8.998
9	13 52 54.27	2.3308	15 1 35.5	15.567	9	15 48 55.64	2.4956	24 59 40.3	8.830
10	13 55 14.22	2.3343	15 17 6.4	15.462	10	15 51 25.45	2.4980	25 8 25.0	8.660
11	13 57 34.39	2.3378	15 32 30.9	15.355	11	15 53 55.40	2.5003	25 16 59.5	8.491
12	13 59 54.76	2.3413	15 47 49.0	15.247	12	15 56 25.49	2.5026	25 25 23.9	8.321
13	14 2 15.35	2.3449	16 3 0.5	15.137	13	15 58 55.71	2.5047	25 33 38.0	8.149
14	14 4 36.15	2.3485	16 18 5.4	15.025	14	16 1 26.06	2.5068	25 41 41.8	7.977
15	14 6 57.17	2.3521	16 33 3.5	14.911	15	16 3 56.53	2.5088	25 49 35.3	7.805
16	14 9 18.40	2.3557	16 47 54.7	14.796	16	16 6 27.11	2.5106	25 57 18.4	7.632
17	14 11 39.85	2.3594	17 2 39.0	14.679	17	16 8 57.80	2.5124	26 4 51.1	7.458
18	14 14 1.53	2.3631	17 17 16.2	14.560	18	16 11 28.60	2.5141	26 12 13.4	7.284
19	14 16 23.43	2.3668	17 31 46.2	14.440	19	16 13 59.49	2.5157	26 19 25.2	7.109
20	14 18 45.55	2.3705	17 46 9.0	14.318	20	16 16 30.48	2.5172	26 26 26.5	6.934
21	14 21 7.89	2.3742	18 0 24.4	14.195	21	16 19 1.55	2.5185	26 33 17.3	6.758
22	14 23 30.46	2.3780	18 14 32.4	14.070	22	16 21 32.70	2.5197	26 39 57.5	6.583
23	14 25 53.25	2.3817	S.18 28 32.8	13.943	23	16 24 3.92	2.5209	S.26 46 27.2	6.407
THURSDAY 2.					SATURDAY 4.				
0	14 28 16.27	2.3855	S.18 42 25.6	13.815	0	16 26 35.21	2.5220	S.26 52 46.3	6.230
1	14 30 39.51	2.3892	18 56 10.6	13.684	1	16 29 6.56	2.5229	26 58 54.8	6.053
2	14 33 2.98	2.3930	19 9 47.7	13.552	2	16 31 37.96	2.5237	27 4 52.6	5.875
3	14 35 26.67	2.3967	19 23 16.9	13.420	3	16 34 9.40	2.5243	27 10 39.8	5.697
4	14 37 50.59	2.4005	19 36 38.1	13.286	4	16 36 40.88	2.5250	27 16 16.3	5.519
5	14 40 14.73	2.4042	19 49 51.2	13.150	5	16 39 12.40	2.5255	27 21 42.1	5.341
6	14 42 39.10	2.4080	20 2 56.1	13.012	6	16 41 43.94	2.5258	27 26 57.2	5.163
7	14 45 3.69	2.4117	20 15 52.7	12.873	7	16 44 15.50	2.5261	27 32 1.6	4.985
8	14 47 28.50	2.4153	20 28 40.9	12.733	8	16 46 47.07	2.5262	27 36 55.4	4.807
9	14 49 53.53	2.4191	20 41 20.7	12.592	9	16 49 18.64	2.5262	27 41 38.4	4.628
10	14 52 18.79	2.4228	20 53 51.9	12.448	10	16 51 50.21	2.5261	27 46 10.7	4.449
11	14 54 44.26	2.4264	21 6 14.5	12.304	11	16 54 21.77	2.5258	27 50 32.3	4.270
12	14 57 9.96	2.4301	21 18 28.4	12.158	12	16 56 53.31	2.5254	27 54 43.1	4.092
13	14 59 35.87	2.4336	21 30 33.5	12.011	13	16 59 24.82	2.5249	27 58 43.2	3.913
14	15 2 1.99	2.4372	21 42 29.7	11.862	14	17 1 56.30	2.5243	28 2 32.7	3.735
15	15 4 28.33	2.4407	21 54 17.0	11.713	15	17 4 27.74	2.5236	28 6 11.4	3.556
16	15 6 54.88	2.4442	22 5 55.3	11.562	16	17 6 59.13	2.5227	28 9 39.4	3.378
17	15 9 21.63	2.4476	22 17 24.5	11.410	17	17 9 30.46	2.5216	28 12 56.7	3.200
18	15 11 48.59	2.4510	22 28 44.5	11.257	18	17 12 1.73	2.5205	28 16 3.4	3.022
19	15 14 15.75	2.4544	22 39 55.3	11.103	19	17 14 32.92	2.5192	28 18 59.4	2.844
20	15 16 43.12	2.4577	22 50 56.8	10.947	20	17 17 4.03	2.5178	28 21 44.7	2.667
21	15 19 10.68	2.4610	23 1 48.9	10.790	21	17 19 35.06	2.5164	28 24 19.4	2.489
22	15 21 38.44	2.4642	23 12 31.6	10.632	22	17 22 6.00	2.5148	28 26 43.4	2.313
23	15 24 6.39	2.4674	23 23 4.8	10.473	23	17 24 36.83	2.5130	28 28 56.9	2.137
24	15 26 34.53	2.4705	S.23 33 28.4	10.313	24	17 27 7.56	2.5112	S.28 30 59.8	1.960

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MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 5.					TUESDAY 7.				
0	17 27 7.56	2.3112	S. 28 30 59.8	1.950	0	19 23 21.85	2.2973	S. 26 54 54.9	5.677
1	17 29 38.17	2.3091	28 32 52.1	1.784	1	19 25 39.51	2.2913	26 49 13.9	5.730
2	17 32 8.65	2.3069	28 34 33.9	1.609	2	19 27 56.80	2.2851	26 43 24.9	5.882
3	17 34 39.00	2.3047	28 36 5.2	1.433	3	19 30 13.72	2.2788	26 37 28.0	6.013
4	17 37 9.21	2.3023	28 37 26.0	1.260	4	19 32 30.25	2.2724	26 31 23.4	6.148
5	17 39 39.27	2.4098	28 38 36.4	1.086	5	19 34 46.41	2.2661	26 25 11.0	6.270
6	17 42 9.18	2.4972	28 39 36.4	0.913	6	19 37 2.18	2.2597	26 18 50.9	6.387
7	17 44 38.93	2.4944	28 40 26.0	0.741	7	19 39 17.57	2.2533	26 12 23.3	6.523
8	17 47 8.51	2.4916	28 41 5.3	0.568	8	19 41 32.58	2.2469	26 5 48.2	6.648
9	17 49 37.92	2.4886	28 41 34.2	0.396	9	19 43 47.20	2.2405	25 59 5.6	6.778
10	17 52 7.14	2.4854	28 41 52.8	0.225	10	19 46 1.44	2.2341	25 52 15.6	6.894
11	17 54 36.17	2.4822	28 42 1.2	-0.055	11	19 48 15.29	2.2276	25 45 18.3	7.023
12	17 57 5.01	2.4789	28 41 59.4	+0.114	12	19 50 28.75	2.2211	25 38 13.8	7.138
13	17 59 33.64	2.4754	28 41 47.5	0.282	13	19 52 41.82	2.2146	25 31 2.1	7.253
14	18 2 2.06	2.4718	28 41 25.5	0.451	14	19 54 54.50	2.2082	25 23 43.4	7.371
15	18 4 30.26	2.4682	28 40 53.4	0.619	15	19 57 6.80	2.2017	25 16 17.6	7.488
16	18 6 58.24	2.4644	28 40 11.2	0.786	16	19 59 18.70	2.1952	25 8 44.9	7.603
17	18 9 25.99	2.4605	28 39 19.1	0.953	17	20 1 30.22	2.1887	25 1 5.3	7.717
18	18 11 53.50	2.4565	28 38 17.0	1.117	18	20 3 41.34	2.1822	24 53 18.9	7.829
19	18 14 20.77	2.4524	28 37 5.1	1.281	19	20 5 52.08	2.1757	24 45 25.8	7.941
20	18 16 47.79	2.4482	28 35 43.3	1.444	20	20 8 2.42	2.1692	24 37 26.0	8.058
21	18 19 14.55	2.4439	28 34 11.8	1.607	21	20 10 12.38	2.1627	24 29 19.6	8.162
22	18 21 41.05	2.4396	28 32 30.5	1.769	22	20 12 21.95	2.1563	24 21 6.7	8.269
23	18 24 7.30	2.4350	S. 28 30 39.5	1.930	23	20 14 31.13	2.1498	S. 24 12 47.3	8.377
MONDAY 6.					WEDNESDAY 8.				
0	18 26 33.26	2.4303	S. 28 28 38.9	2.089	0	20 16 39.93	2.1434	S. 24 4 21.5	8.483
1	18 28 58.94	2.4257	28 26 28.8	2.248	1	20 18 48.34	2.1369	23 55 49.4	8.587
2	18 31 24.34	2.4209	28 24 9.1	2.407	2	20 20 56.36	2.1305	23 47 11.1	8.689
3	18 33 49.45	2.4161	28 21 40.0	2.563	3	20 23 4.00	2.1241	23 38 26.7	8.792
4	18 36 14.27	2.4111	28 19 1.5	2.720	4	20 25 11.26	2.1176	23 29 36.1	8.894
5	18 38 38.78	2.4060	28 16 13.6	2.875	5	20 27 18.14	2.1114	23 20 39.5	8.993
6	18 41 2.99	2.4009	28 13 16.5	3.028	6	20 29 24.63	2.1051	23 11 36.9	9.092
7	18 43 26.89	2.3957	28 10 10.2	3.182	7	20 31 30.75	2.0988	23 2 28.5	9.189
8	18 45 50.48	2.3905	28 6 54.7	3.334	8	20 33 36.49	2.0925	22 53 14.2	9.287
9	18 48 13.75	2.3851	28 3 30.1	3.485	9	20 35 41.85	2.0862	22 43 54.1	9.383
10	18 50 36.69	2.3797	27 59 56.5	3.635	10	20 37 46.84	2.0800	22 34 28.3	9.477
11	18 52 59.31	2.3742	27 56 13.9	3.784	11	20 39 51.45	2.0738	22 24 56.9	9.569
12	18 55 21.60	2.3687	27 52 22.4	3.932	12	20 41 55.70	2.0677	22 15 20.0	9.661
13	18 57 43.55	2.3630	27 48 22.1	4.078	13	20 43 59.57	2.0615	22 5 37.6	9.752
14	19 0 5.16	2.3573	27 44 13.0	4.223	14	20 46 3.08	2.0553	21 55 49.8	9.842
15	19 2 26.43	2.3516	27 39 55.3	4.368	15	20 48 6.23	2.0494	21 45 56.6	9.931
16	19 4 47.35	2.3457	27 35 28.9	4.512	16	20 50 9.01	2.0433	21 35 58.1	10.018
17	19 7 7.91	2.3398	27 30 53.9	4.653	17	20 52 11.43	2.0373	21 25 54.4	10.104
18	19 9 28.13	2.3340	27 26 10.5	4.794	18	20 54 13.49	2.0314	21 15 45.6	10.190
19	19 11 47.99	2.3280	27 21 18.6	4.935	19	20 56 15.20	2.0255	21 5 31.6	10.275
20	19 14 7.49	2.3220	27 15 18.3	5.074	20	20 58 16.55	2.0196	20 55 12.6	10.358
21	19 16 26.63	2.3159	27 11 9.7	5.212	21	21 0 17.55	2.0138	20 44 48.7	10.440
22	19 18 45.40	2.3098	27 5 52.9	5.348	22	21 2 18.20	2.0080	20 34 19.8	10.522
23	19 21 3.81	2.3037	27 0 27.9	5.483	23	21 4 18.51	2.0023	20 23 46.1	10.602
24	19 23 21.85	2.2975	S. 26 54 54.9	5.617	24	21 6 18.48	1.9966	S. 20 13 7.6	10.682

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 21.					THURSDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	6 42 36.64	2.4753	N.28 6 40.8	3.243	0	8 39 25.91	2.3641	N.22 22 2.3	10.877
1	6 45 5.15	2.4751	28 3 21.1	3.413	1	8 41 47.64	2.3604	22 11 5.5	11.017
2	6 47 33.65	2.4748	27 59 51.3	3.582	2	8 44 9.16	2.3568	22 0 0.3	11.156
3	6 50 2.12	2.4743	27 56 11.3	3.752	3	8 46 30.46	2.3531	21 48 46.8	11.293
4	6 52 30.56	2.4737	27 52 21.1	3.921	4	8 48 51.53	2.3494	21 37 25.1	11.429
5	6 54 58.96	2.4729	27 48 20.8	4.090	5	8 51 12.39	2.3457	21 25 55.3	11.565
6	6 57 27.31	2.4722	27 44 10.3	4.259	6	8 53 33.02	2.3420	21 14 17.3	11.700
7	6 59 55.62	2.4713	27 39 49.7	4.428	7	8 55 53.43	2.3383	21 2 31.3	11.833
8	7 2 23.87	2.4703	27 35 18.9	4.597	8	8 58 13.62	2.3346	20 50 37.4	11.964
9	7 4 52.06	2.4692	27 30 38.1	4.765	9	9 0 33.58	2.3308	20 38 35.6	12.095
10	7 7 20.17	2.4679	27 25 47.1	4.933	10	9 2 53.32	2.3272	20 26 26.0	12.224
11	7 9 48.21	2.4666	27 20 46.1	5.100	11	9 5 12.84	2.3235	20 14 8.7	12.352
12	7 12 16.16	2.4651	27 15 35.1	5.268	12	9 7 32.14	2.3198	20 1 43.7	12.480
13	7 14 44.02	2.4636	27 10 14.0	5.435	13	9 9 51.22	2.3162	19 49 11.1	12.606
14	7 17 11.79	2.4620	27 4 42.9	5.602	14	9 12 10.08	2.3125	19 36 31.0	12.730
15	7 19 39.46	2.4603	26 59 1.8	5.768	15	9 14 28.72	2.3088	19 23 43.5	12.853
16	7 22 7.03	2.4585	26 53 10.8	5.933	16	9 16 47.14	2.3052	19 10 48.6	12.976
17	7 24 34.48	2.4566	26 47 9.8	6.098	17	9 19 5.34	2.3016	18 57 46.4	13.097
18	7 27 1.82	2.4546	26 40 59.0	6.262	18	9 21 23.33	2.2980	18 44 37.0	13.216
19	7 29 29.03	2.4525	26 34 38.3	6.428	19	9 23 41.10	2.2944	18 31 20.5	13.334
20	7 31 56.12	2.4504	26 28 7.7	6.592	20	9 25 58.66	2.2908	18 17 56.9	13.452
21	7 34 23.08	2.4481	26 21 27.3	6.754	21	9 28 16.00	2.2873	18 4 26.3	13.568
22	7 36 49.89	2.4458	26 14 37.2	6.917	22	9 30 33.14	2.2838	17 50 48.8	13.682
23	7 39 16.57	2.4434	N.26 7 37.3	7.079	23	9 32 50.06	2.2803	N.17 37 4.5	13.794
WEDNESDAY 22.					FRIDAY 24.				
0	7 41 43.10	2.4408	N.26 0 27.7	7.241	0	9 35 6.78	2.2770	N.17 23 13.5	13.906
1	7 44 9.47	2.4383	25 53 8.4	7.402	1	9 37 23.30	2.2736	17 9 15.8	14.017
2	7 46 35.69	2.4357	25 45 39.5	7.562	2	9 39 39.61	2.2702	16 55 11.5	14.125
3	7 49 1.75	2.4330	25 38 1.0	7.721	3	9 41 55.72	2.2668	16 41 0.8	14.232
4	7 51 27.65	2.4302	25 30 13.0	7.880	4	9 44 11.63	2.2636	16 26 43.6	14.339
5	7 53 53.37	2.4273	25 22 15.4	8.038	5	9 46 27.35	2.2603	16 12 20.1	14.444
6	7 56 18.93	2.4245	25 14 8.4	8.195	6	9 48 42.87	2.2571	15 57 50.3	14.547
7	7 58 44.31	2.4215	25 5 52.0	8.352	7	9 50 58.20	2.2539	15 43 14.4	14.649
8	8 1 9.51	2.4185	24 57 26.2	8.508	8	9 53 13.34	2.2508	15 28 32.4	14.750
9	8 3 34.53	2.4154	24 48 51.1	8.663	9	9 55 28.29	2.2477	15 13 44.4	14.849
10	8 5 59.36	2.4123	24 40 6.7	8.817	10	9 57 43.07	2.2447	14 58 50.5	14.947
11	8 8 24.00	2.4091	24 31 13.1	8.969	11	9 59 57.66	2.2417	14 43 50.8	15.043
12	8 10 48.45	2.4058	24 22 10.4	9.122	12	10 2 12.07	2.2388	14 28 45.3	15.138
13	8 13 12.70	2.4025	24 12 58.5	9.273	13	10 4 26.31	2.2359	14 13 34.2	15.232
14	8 15 36.75	2.3992	24 3 37.6	9.423	14	10 6 40.38	2.2331	13 58 17.5	15.323
15	8 18 0.61	2.3959	23 54 7.7	9.573	15	10 8 54.28	2.2303	13 42 55.4	15.413
16	8 20 24.26	2.3924	23 44 28.8	9.722	16	10 11 8.02	2.2277	13 27 27.9	15.502
17	8 22 47.70	2.3890	23 34 41.0	9.870	17	10 13 21.60	2.2250	13 11 55.1	15.590
18	8 25 10.94	2.3856	23 24 44.4	10.017	18	10 15 35.02	2.2223	12 56 17.1	15.676
19	8 27 33.97	2.3821	23 14 39.0	10.163	19	10 17 48.28	2.2198	12 40 34.0	15.760
20	8 29 56.79	2.3785	23 4 24.9	10.308	20	10 20 1.40	2.2174	12 24 45.9	15.843
21	8 32 19.39	2.3749	22 54 2.1	10.452	21	10 22 14.37	2.2150	12 8 52.8	15.925
22	8 34 41.78	2.3713	22 43 30.7	10.595	22	10 24 27.20	2.2127	11 52 54.9	16.005
23	8 37 3.95	2.3677	22 32 50.7	10.737	23	10 26 39.89	2.2103	11 36 52.2	16.083
24	8 39 25.91	2.3641	N.22 22 2.3	10.877	24	10 28 52.44	2.2081	N.11 20 44.9	16.159

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 29.					FRIDAY 31.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	14 2 23.50	2.3583	S. 16 1 45.3	15.129	0	16 0 56.12	2.5652	S. 25 34 22.9	8.137
1	14 4 45.14	2.3631	16 16 49.9	15.024	1	16 3 30.12	2.5679	25 42 25.8	7.959
2	14 7 7.07	2.3678	16 31 48.2	14.917	2	16 6 4.27	2.5705	25 50 18.0	7.780
3	14 9 29.28	2.3726	16 46 39.9	14.807	3	16 8 38.58	2.5730	25 57 59.4	7.600
4	14 11 51.78	2.3774	17 1 25.0	14.695	4	16 11 13.03	2.5753	26 5 30.0	7.419
5	14 14 14.57	2.3823	17 16 3.3	14.581	5	16 13 47.61	2.5774	26 12 49.7	7.238
6	14 16 37.65	2.3871	17 30 34.7	14.466	6	16 16 22.32	2.5795	26 19 58.5	7.057
7	14 19 1.02	2.3919	17 44 59.2	14.348	7	16 18 57.15	2.5815	26 26 56.4	6.873
8	14 21 24.68	2.3968	17 59 16.6	14.230	8	16 21 32.10	2.5833	26 33 43.4	6.691
9	14 23 48.63	2.4017	18 13 26.8	14.109	9	16 24 7.15	2.5850	26 40 19.4	6.508
10	14 26 12.88	2.4066	18 27 29.7	13.986	10	16 26 42.30	2.5866	26 46 44.3	6.323
11	14 28 37.42	2.4114	18 41 25.1	13.861	11	16 29 17.54	2.5880	26 52 58.1	6.138
12	14 31 2.25	2.4163	18 55 13.0	13.734	12	16 31 52.86	2.5892	26 59 0.9	5.953
13	14 33 27.37	2.4211	19 8 53.2	13.606	13	16 34 28.25	2.5904	27 4 52.5	5.768
14	14 35 52.78	2.4260	19 22 25.7	13.476	14	16 37 3.71	2.5914	27 10 33.0	5.582
15	14 38 18.49	2.4309	19 35 50.3	13.343	15	16 39 39.22	2.5922	27 16 2.3	5.395
16	14 40 44.49	2.4357	19 49 6.9	13.209	16	16 42 14.78	2.5929	27 21 20.4	5.208
17	14 43 10.77	2.4405	20 2 15.4	13.074	17	16 44 50.37	2.5934	27 26 27.3	5.021
18	14 45 37.35	2.4453	20 15 15.8	12.937	18	16 47 25.99	2.5939	27 31 23.0	4.834
19	14 48 4.21	2.4501	20 28 7.9	12.798	19	16 50 1.64	2.5942	27 36 7.4	4.647
20	14 50 31.36	2.4548	20 40 51.6	12.657	20	16 52 37.29	2.5943	27 40 40.6	4.459
21	14 52 58.79	2.4595	20 53 26.8	12.515	21	16 55 12.95	2.5943	27 45 2.5	4.272
22	14 55 26.50	2.4642	21 5 53.4	12.372	22	16 57 48.60	2.5941	27 49 13.2	4.084
23	14 57 54.50	2.4689	S. 21 18 11.4	12.227	23	17 0 24.24	2.5937	S. 27 53 12.6	3.897
THURSDAY 30.					SATURDAY, NOVEMBER 1.				
0	15 0 22.77	2.4735	S. 21 30 20.6	12.079	0	17 2 59.85	2.5932	S. 27 57 0.8	3.709
1	15 2 51.32	2.4781	21 42 20.9	11.930	PHASES OF THE MOON.				
2	15 5 20.14	2.4827	21 54 12.2	11.780					
3	15 7 49.24	2.4872	22 5 54.5	11.629					
4	15 10 18.60	2.4916	22 17 27.7	11.476					
5	15 12 48.23	2.4961	22 28 51.6	11.320					
6	15 15 18.13	2.5004	22 40 6.1	11.164	<div><div></div><div>d h m</div></div> <div>☾ First Quarter . . . Oct. 6 13 46.2</div> <div>☉ Full Moon 14 18 6.9</div> <div>☾ Last Quarter 22 10 53.0</div> <div>● New Moon 29 2 29.2</div>				
7	15 17 48.28	2.5046	22 51 11.2	11.007					
8	15 20 18.68	2.5088	23 2 6.9	10.848					
9	15 22 49.34	2.5130	23 12 53.0	10.688					
10	15 25 20.24	2.5170	23 23 29.4	10.526					
11	15 27 51.38	2.5211	23 33 56.1	10.363	<div><div></div><div>d h</div></div> <div>☾ Apogee Oct. 12 3.2</div> <div>☾ Perigee 27 15.9</div>				
12	15 30 22.77	2.5251	23 44 12.9	10.198					
13	15 32 54.39	2.5289	23 54 19.8	10.032					
14	15 35 26.24	2.5327	24 4 16.8	9.866					
15	15 37 58.31	2.5363	24 14 3.7	9.698					
16	15 40 30.60	2.5399	24 23 40.5	9.528					
17	15 43 3.10	2.5435	24 33 7.1	9.358					
18	15 45 35.82	2.5469	24 42 23.5	9.187					
19	15 48 8.73	2.5502	24 51 29.5	9.014					
20	15 50 41.84	2.5534	25 0 25.2	8.841					
21	15 53 15.14	2.5566	25 9 10.4	8.667					
22	15 55 48.63	2.5596	25 17 45.1	8.491					
23	15 58 22.29	2.5624	25 26 9.3	8.314					
24	16 0 56.12	2.5652	S. 25 34 22.9	8.137					

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.		
		h m s	s	° ' "	"	' "	s	m s
Sat.	1	14 24 18.56	9.786	S.14 19 53.2	-48.32	16 9.07	66.86	16 18.90
SUN.	2	14 28 13.84	9.819	14 39 5.8	47.72	16 9.33	66.97	16 20.18
Mon.	3	14 32 9.90	9.852	14 58 4.1	47.11	16 9.58	67.08	16 20.67
Tues.	4	14 36 6.76	9.886	15 16 47.6	-46.49	16 9.83	67.20	16 20.37
Wed.	5	14 40 4.42	9.920	15 35 16.0	45.86	16 10.07	67.32	16 19.27
Thur.	6	14 44 2.90	9.954	15 53 28.9	45.21	16 10.32	67.44	16 17.35
Fri.	7	14 48 2.19	9.988	16 11 25.8	-44.53	16 10.56	67.56	16 14.61
Sat.	8	14 52 2.31	10.022	16 29 6.3	43.84	16 10.80	67.68	16 11.05
SUN.	9	14 56 3.27	10.057	16 46 30.2	43.14	16 11.04	67.80	16 6.67
Mon.	10	15 0 5.06	10.092	17 3 37.0	-42.42	16 11.27	67.92	16 1.46
Tues.	11	15 4 7.69	10.127	17 20 26.3	41.68	16 11.50	68.04	15 55.41
Wed.	12	15 8 11.15	10.162	17 36 57.7	40.92	16 11.73	68.16	15 48.52
Thur.	13	15 12 15.46	10.197	17 53 10.8	-40.15	16 11.95	68.28	15 40.78
Fri.	14	15 16 20.62	10.233	18 9 5.3	39.37	16 12.17	68.40	15 32.20
Sat.	15	15 20 26.63	10.268	18 24 40.8	38.58	16 12.39	68.52	15 22.77
SUN.	16	15 24 33.50	10.303	18 39 56.8	-37.76	16 12.60	68.64	15 12.49
Mon.	17	15 28 41.22	10.339	18 54 53.1	36.93	16 12.80	68.76	15 1.36
Tues.	18	15 32 49.79	10.374	19 9 29.3	36.08	16 13.00	68.88	14 49.38
Wed.	19	15 36 59.21	10.409	19 23 45.0	-35.22	16 13.20	68.99	14 36.55
Thur.	20	15 41 9.48	10.445	19 37 39.7	34.34	16 13.39	69.10	14 22.88
Fri.	21	15 45 20.58	10.480	19 51 13.2	33.44	16 13.58	69.21	14 8.37
Sat.	22	15 49 32.52	10.514	20 4 25.1	-32.53	16 13.76	69.32	13 53.04
SUN.	23	15 53 45.27	10.548	20 17 15.0	31.61	16 13.94	69.43	13 36.89
Mon.	24	15 57 58.83	10.581	20 29 42.5	30.67	16 14.12	69.53	13 19.93
Tues.	25	16 2 13.19	10.614	20 41 47.3	-29.72	16 14.30	69.63	13 2.18
Wed.	26	16 6 28.32	10.646	20 53 28.9	28.75	16 14.47	69.74	12 43.66
Thur.	27	16 10 44.21	10.677	21 4 47.0	27.76	16 14.64	69.84	12 24.39
Fri.	28	16 15 0.83	10.707	21 15 41.3	-26.76	16 14.81	69.94	12 4.38
Sat.	29	16 19 18.16	10.736	21 26 11.5	25.75	16 14.98	70.04	11 43.66
SUN.	30	16 23 36.17	10.764	21 36 17.2	24.72	16 15.14	70.13	11 22.26
Mon.	31	16 27 54.85	10.791	S.21 45 58.2	-23.68	16 15.30	70.22	11 0.20

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.18 from sidereal time.
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.			
		Apparent Right Ascension.			Diff. for 1 Hour.	Apparent Declination.			Diff. for 1 Hour.						
		h	m	s	s	°	'	"	"	m	s	s	h	m	s
Sat.	1	14	24	21.23	9.787	S. 14	20	6.3	-48.31	16	18.92	0.070	14	40	40.14
SUN.	2	14	28	16.51	9.820	14	39	18.8	47.72	16	20.19	0.037	14	44	36.70
Mon.	3	14	32	12.58	9.853	14	58	16.9	47.11	16	20.67	0.003	14	48	33.25
Tues.	4	14	36	9.45	9.886	15	17	0.3	-46.49	16	20.36	0.030	14	52	29.81
Wed.	5	14	40	7.12	9.920	15	35	28.5	45.85	16	19.24	0.063	14	56	26.36
Thur.	6	14	44	5.60	9.954	15	53	41.2	45.20	16	17.31	0.097	15	0	22.92
Fri.	7	14	48	4.90	9.988	16	11	37.9	-44.52	16	14.57	0.131	15	4	19.48
Sat.	8	14	52	5.02	10.022	16	29	18.2	43.83	16	11.01	0.166	15	8	16.03
SUN.	9	14	56	5.97	10.057	16	46	41.8	43.13	16	6.62	0.201	15	12	12.59
Mon.	10	15	0	7.75	10.092	17	3	48.3	-42.41	16	1.40	0.236	15	16	9.15
Tues.	11	15	4	10.37	10.127	17	20	37.3	41.67	15	55.34	0.270	15	20	5.70
Wed.	12	15	8	13.82	10.162	17	37	8.4	40.91	15	48.44	0.305	15	24	2.26
Thur.	13	15	12	18.12	10.197	17	53	21.2	-40.14	15	40.69	0.340	15	27	58.82
Fri.	14	15	16	23.27	10.232	18	9	15.4	39.36	15	32.10	0.376	15	31	55.37
Sat.	15	15	20	29.27	10.267	18	24	50.6	38.56	15	22.66	0.411	15	35	51.93
SUN.	16	15	24	36.12	10.303	18	40	6.3	-37.74	15	12.38	0.446	15	39	48.49
Mon.	17	15	28	43.81	10.339	18	55	2.3	36.91	15	1.24	0.482	15	43	45.04
Tues.	18	15	32	52.35	10.374	19	9	38.2	36.07	14	49.25	0.517	15	47	41.60
Wed.	19	15	37	1.74	10.409	19	23	53.5	-35.21	14	36.42	0.552	15	51	38.16
Thur.	20	15	41	11.98	10.444	19	37	47.9	34.33	14	22.74	0.587	15	55	34.72
Fri.	21	15	45	23.05	10.479	19	51	21.1	33.43	14	8.23	0.622	15	59	31.28
Sat.	22	15	49	34.95	10.513	20	4	32.6	-32.52	13	52.89	0.656	16	3	27.83
SUN.	23	15	53	47.66	10.547	20	17	22.2	31.60	13	36.73	0.690	16	7	24.39
Mon.	24	15	58	1.18	10.580	20	29	49.3	30.66	13	19.77	0.723	16	11	20.95
Tues.	25	16	2	15.49	10.612	20	41	53.7	-29.70	13	2.01	0.756	16	15	17.51
Wed.	26	16	6	30.57	10.644	20	53	35.0	28.73	12	43.49	0.787	16	19	14.06
Thur.	27	16	10	46.41	10.675	21	4	52.8	27.75	12	24.22	0.818	16	23	10.62
Fri.	28	16	15	2.98	10.705	21	15	46.7	-26.75	12	4.21	0.848	16	27	7.18
Sat.	29	16	19	20.25	10.734	21	26	16.5	25.73	11	43.49	0.877	16	31	3.74
SUN.	30	16	23	38.20	10.762	21	36	21.9	24.71	11	22.09	0.905	16	35	0.30
Mon.	31	16	27	56.82	10.789	S. 21	46	2.5	-23.67	11	0.03	0.932	16	38	56.86

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour.
+9°.8565.
(Table III.)

AT GREENWICH MEAN NOON.													
Day of the Month.	Day of the Year.	THE SUN'S						Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.			
		True Longitude.			Diff. for 1 Hour.	Latitude.							
		λ	λ'	λ''									
		°	'	''	'	''	''	''			h	m	s
1	305	218	28	28.1	27	45.1	150.21	−0.67	9.996 5975	−47.4	9	17	48.23
2	306	219	28	34.1	27	51.0	150.28	0.67	9.996 4837	47.2	9	13	52.32
3	307	220	28	41.8	27	58.5	150.34	0.64	9.996 3705	46.9	9	9	56.41
4	308	221	28	51.0	28	7.5	150.41	−0.60	9.996 2580	−46.6	9	6	0.50
5	309	222	29	1.7	28	18.1	150.48	0.52	9.996 1465	46.2	9	2	4.59
6	310	223	29	13.9	28	30.2	150.55	0.42	9.996 0361	45.7	8	58	8.68
7	311	224	29	27.7	28	43.8	150.61	−0.31	9.995 9269	−45.2	8	54	12.77
8	312	225	29	43.0	28	58.9	150.67	0.19	9.995 8191	44.6	8	50	16.86
9	313	226	29	59.8	29	15.6	150.73	−0.06	9.995 7128	44.0	8	46	20.94
10	314	227	30	18.2	29	33.8	150.79	+0.06	9.995 6081	−43.3	8	42	25.03
11	315	228	30	38.1	29	53.5	150.86	0.17	9.995 5050	42.6	8	38	29.12
12	316	229	30	59.5	30	14.8	150.93	0.28	9.995 4037	41.8	8	34	33.21
13	317	230	31	22.5	30	37.7	150.99	+0.38	9.995 3043	−41.0	8	30	37.30
14	318	231	31	47.1	31	2.2	151.06	0.45	9.995 2069	40.2	8	26	41.39
15	319	232	32	13.4	31	28.3	151.13	0.49	9.995 1115	39.3	8	22	45.48
16	320	233	32	41.4	31	56.1	151.20	+0.50	9.995 0181	−38.5	8	18	49.57
17	321	234	33	11.1	32	25.6	151.28	0.48	9.994 9266	37.7	8	14	53.66
18	322	235	33	42.6	32	56.9	151.35	0.43	9.994 8371	36.9	8	10	57.75
19	323	236	34	15.8	33	29.9	151.42	+0.35	9.994 7495	−36.1	8	7	1.83
20	324	237	34	50.8	34	4.7	151.49	0.25	9.994 6637	35.4	8	3	5.92
21	325	238	35	27.5	34	41.3	151.57	+0.14	9.994 5796	34.7	7	59	10.01
22	326	239	36	6.0	35	19.6	151.64	0.00	9.994 4971	−34.1	7	55	14.10
23	327	240	36	46.3	35	59.7	151.71	−0.13	9.994 4161	33.5	7	51	18.19
24	328	241	37	28.2	36	41.5	151.78	0.26	9.994 3365	32.9	7	47	22.27
25	329	242	38	11.7	37	24.8	151.85	−0.38	9.994 2581	−32.4	7	43	26.36
26	330	243	38	56.7	38	9.6	151.91	0.48	9.994 1809	31.9	7	39	30.45
27	331	244	39	43.2	38	55.9	151.96	0.55	9.994 1048	31.5	7	35	34.54
28	332	245	40	31.0	39	43.5	152.02	−0.59	9.994 0299	−31.0	7	31	38.63
29	333	246	41	20.0	40	32.3	152.07	0.59	9.993 9561	30.5	7	27	42.71
30	334	247	42	10.1	41	22.2	152.11	0.56	9.993 8836	30.0	7	23	46.80
31	335	248	43	1.3	42	13.2	152.15	−0.51	9.993 8123	−29.4	7	19	50.89

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour,
−9^s.8296.
(Table II.)

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 57.4	15 50.0	58 27.94	-2.262	58 0.51	-2.301	2 28.3	2.53	2.9
2	15 42.4	15 35.0	57 32.92	2.290	57 5.76	2.231	3 28.3	2.45	3.9
3	15 27.9	15 21.1	56 39.54	2.133	56 14.68	2.006	4 25.5	2.30	4.9
4	15 14.8	15 9.0	55 51.50	-1.854	55 30.30	-1.677	5 18.3	2.10	5.9
5	15 3.8	14 59.3	55 11.32	1.484	54 54.71	1.282	6 6.5	1.92	6.9
6	14 55.5	14 52.3	54 40.58	1.073	54 28.96	0.863	6 50.8	1.77	7.9
7	14 49.8	14 48.0	54 19.86	-0.653	54 13.25	-0.449	7 32.0	1.67	8.9
8	14 46.9	14 46.4	54 9.07	-0.250	54 7.21	-0.061	8 11.5	1.62	9.9
9	14 46.5	14 47.1	54 7.55	+0.115	54 9.94	+0.280	8 50.2	1.61	10.9
10	14 48.3	14 50.0	54 14.24	+0.433	54 20.26	+0.569	9 29.4	1.66	11.9
11	14 52.0	14 54.4	54 27.82	0.690	54 36.75	0.796	10 10.1	1.75	12.9
12	14 57.2	15 0.2	54 46.86	0.886	54 57.97	0.963	10 53.5	1.88	13.9
13	15 3.5	15 6.9	55 9.92	+1.026	55 22.56	+1.077	11 40.4	2.04	14.9
14	15 10.5	15 14.2	55 35.74	1.118	55 49.35	1.149	12 31.3	2.20	15.9
15	15 18.0	15 21.9	56 3.29	1.173	56 17.48	1.191	13 25.8	2.34	16.9
16	15 25.8	15 29.8	56 31.85	+1.203	56 46.36	+1.214	14 23.0	2.41	17.9
17	15 33.7	15 37.8	57 1.00	1.224	57 15.74	1.231	15 20.8	2.39	18.9
18	15 41.8	15 45.8	57 30.55	1.236	57 45.40	1.238	16 17.3	2.31	19.9
19	15 49.9	15 53.9	58 0.26	+1.236	58 15.05	+1.227	17 11.3	2.19	20.9
20	15 57.9	16 1.8	58 29.69	1.208	58 44.02	1.177	18 2.5	2.08	21.9
21	16 5.6	16 9.2	58 57.85	1.126	59 10.98	1.058	18 51.6	2.02	22.9
22	16 12.5	16 15.5	59 23.15	+0.966	59 34.06	+0.848	19 39.8	2.01	23.9
23	16 18.0	16 20.0	59 43.39	0.702	59 50.79	0.526	20 28.4	2.06	24.9
24	16 21.4	16 22.1	59 55.92	+0.325	59 58.50	+0.101	21 18.9	2.16	25.9
25	16 22.1	16 21.2	59 58.26	-0.143	59 55.01	-0.399	22 12.3	2.30	26.9
26	16 19.4	16 16.8	59 48.66	0.659	59 39.20	0.915	23 9.3	2.44	27.9
27	16 13.4	16 9.3	59 26.73	1.160	59 11.43	1.385	6	.	28.9
28	16 4.4	15 59.0	58 53.61	-1.580	58 33.64	-1.741	0 9.3	2.54	0.4
29	15 53.1	15 46.8	58 11.98	1.863	57 49.09	1.944	1 10.5	2.54	1.4
30	15 40.4	15 33.9	57 25.49	1.983	57 1.67	1.980	2 10.3	2.43	2.4
31	15 27.5	15 21.3	56 38.12	1.938	56 15.29	1.859	3 6.5	2.24	3.4
32	15 15.4	15 9.9	55 53.60	-1.749	55 33.41	-1.610	3 57.8	2.04	4.4

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 1.					MONDAY 3.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	17 2 59.85	2.5932	S. 27 57 0.8	3.709	0	19 4 7.48	2.4049	S. 27 27 42.8	4.611
1	17 5 35.42	2.5925	28 0 37.7	3.522	1	19 6 31.58	2.3983	27 23 1.7	4.759
2	17 8 10.95	2.5917	28 4 3.4	3.334	2	19 8 55.28	2.3917	27 18 11.7	4.907
3	17 10 46.43	2.5907	28 7 17.8	3.147	3	19 11 18.58	2.3850	27 13 12.9	5.053
4	17 13 21.85	2.5897	28 10 21.0	2.960	4	19 13 41.48	2.3783	27 8 5.4	5.197
5	17 15 57.19	2.5884	28 13 13.0	2.773	5	19 16 3.97	2.3715	27 2 49.3	5.339
6	17 18 32.45	2.5869	28 15 53.7	2.586	6	19 18 26.06	2.3647	26 57 24.7	5.481
7	17 21 7.62	2.5853	28 18 23.3	2.400	7	19 20 47.73	2.3577	26 51 51.6	5.622
8	17 23 42.69	2.5837	28 20 41.7	2.214	8	19 23 8.98	2.3507	26 46 10.1	5.761
9	17 26 17.66	2.5818	28 22 49.0	2.028	9	19 25 29.82	2.3438	26 40 20.3	5.898
10	17 28 52.51	2.5798	28 24 45.1	1.842	10	19 27 50.24	2.3368	26 34 22.3	6.034
11	17 31 27.24	2.5777	28 26 30.1	1.657	11	19 30 10.23	2.3297	26 28 16.2	6.169
12	17 34 1.83	2.5753	28 28 4.0	1.472	12	19 32 29.80	2.3226	26 22 2.0	6.303
13	17 36 36.27	2.5728	28 29 26.8	1.289	13	19 34 48.94	2.3154	26 15 39.8	6.435
14	17 39 10.56	2.5702	28 30 38.7	1.107	14	19 37 7.65	2.3083	26 9 9.8	6.565
15	17 41 44.69	2.5673	28 31 39.6	0.923	15	19 39 25.94	2.3012	26 2 32.0	6.694
16	17 44 18.64	2.5643	28 32 29.5	0.741	16	19 41 43.79	2.2939	25 55 46.5	6.822
17	17 46 52.41	2.5613	28 33 8.5	0.559	17	19 44 1.21	2.2867	25 48 53.3	6.949
18	17 49 26.00	2.5582	28 33 36.6	0.378	18	19 46 18.20	2.2795	25 41 52.6	7.074
19	17 51 59.39	2.5548	28 33 53.9	0.198	19	19 48 34.75	2.2722	25 34 44.4	7.198
20	17 54 32.57	2.5513	28 34 0.4	-0.018	20	19 50 50.86	2.2649	25 27 28.8	7.320
21	17 57 5.54	2.5477	28 33 56.1	+0.161	21	19 53 6.54	2.2577	25 20 6.0	7.441
22	17 59 38.29	2.5439	28 33 41.1	0.338	22	19 55 21.78	2.2504	25 12 35.9	7.562
23	18 2 10.81	2.5400	S. 28 33 15.5	0.515	23	19 57 36.59	2.2432	S. 25 4 58.6	7.680
SUNDAY 2.					TUESDAY 4.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	18 4 43.09	2.5359	S. 28 32 39.3	0.692	0	19 59 50.96	2.2358	S. 24 57 14.3	7.797
1	18 7 15.12	2.5317	28 31 52.5	0.867	1	20 2 4.89	2.2285	24 49 23.0	7.912
2	18 9 46.90	2.5274	28 30 55.2	1.042	2	20 4 18.38	2.2212	24 41 24.9	8.026
3	18 12 18.41	2.5229	28 29 47.5	1.215	3	20 6 31.44	2.2140	24 33 19.9	8.139
4	18 14 49.65	2.5184	28 28 29.4	1.388	4	20 8 44.06	2.2067	24 25 8.2	8.250
5	18 17 20.62	2.5137	28 27 0.9	1.560	5	20 10 56.24	2.1994	24 16 49.8	8.361
6	18 19 51.30	2.5089	28 25 22.2	1.730	6	20 13 7.99	2.1922	24 8 24.9	8.470
7	18 22 21.69	2.5040	28 23 33.3	1.900	7	20 15 19.31	2.1851	23 59 53.5	8.578
8	18 24 51.78	2.4990	28 21 34.2	2.069	8	20 17 30.20	2.1778	23 51 15.6	8.684
9	18 27 21.57	2.4938	28 19 25.0	2.237	9	20 19 40.65	2.1706	23 42 31.4	8.788
10	18 29 51.04	2.4885	28 17 5.8	2.403	10	20 21 50.67	2.1634	23 33 41.0	8.892
11	18 32 20.19	2.4832	28 14 36.6	2.569	11	20 24 0.26	2.1562	23 24 44.4	8.995
12	18 34 49.02	2.4777	28 11 57.5	2.733	12	20 26 9.42	2.1491	23 15 41.6	9.097
13	18 37 17.51	2.4721	28 9 8.6	2.896	13	20 28 18.15	2.1420	23 6 32.8	9.196
14	18 39 45.67	2.4664	28 6 10.0	3.058	14	20 30 26.46	2.1350	22 57 18.1	9.293
15	18 42 13.48	2.4607	28 3 1.7	3.219	15	20 32 34.35	2.1280	22 47 57.6	9.391
16	18 44 40.95	2.4548	27 59 43.7	3.378	16	20 34 41.82	2.1210	22 38 31.2	9.487
17	18 47 8.06	2.4488	27 56 16.2	3.537	17	20 36 48.87	2.1140	22 28 59.1	9.582
18	18 49 34.81	2.4428	27 52 39.2	3.694	18	20 38 55.50	2.1071	22 19 21.4	9.675
19	18 52 1.20	2.4367	27 48 52.9	3.850	19	20 41 1.72	2.1002	22 9 38.1	9.767
20	18 54 27.21	2.4304	27 44 57.2	4.005	20	20 43 7.52	2.0933	21 59 49.4	9.858
21	18 56 52.85	2.4242	27 40 52.3	4.158	21	20 45 12.92	2.0866	21 49 55.2	9.948
22	18 59 18.11	2.4178	27 36 38.2	4.311	22	20 47 17.91	2.0798	21 39 55.6	10.037
23	19 1 42.99	2.4114	27 32 15.0	4.462	23	20 49 22.49	2.0730	21 29 50.8	10.123
24	19 4 7.48	2.4049	S. 27 27 42.8	4.611	24	20 51 26.67	2.0663	S. 21 19 40.8	10.209

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 17.					WEDNESDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	6 29 4.36	2.4832	N.28 11 26.0	2.392	0	8 25 54.81	2.3525	N.23 8 26.1	9.968
1	6 31 33.34	2.4828	28 8 57.4	2.562	1	8 28 15.83	2.3482	22 58 23.9	10.106
2	6 34 2.30	2.4823	28 6 18.6	2.732	2	8 30 36.59	2.3438	22 48 13.4	10.242
3	6 36 31.22	2.4818	28 3 29.6	2.901	3	8 32 57.09	2.3394	22 37 54.8	10.377
4	6 39 0.11	2.4811	28 0 30.5	3.070	4	8 35 17.32	2.3350	22 27 28.2	10.510
5	6 41 28.95	2.4802	27 57 21.2	3.240	5	8 37 37.29	2.3307	22 16 53.6	10.642
6	6 43 57.73	2.4792	27 54 1.7	3.409	6	8 39 57.01	2.3264	22 6 11.1	10.773
7	6 46 26.45	2.4781	27 50 32.1	3.577	7	8 42 16.46	2.3219	21 55 20.8	10.903
8	6 48 55.10	2.4769	27 46 52.5	3.745	8	8 44 35.64	2.3175	21 44 22.7	11.032
9	6 51 23.68	2.4756	27 43 2.7	3.914	9	8 46 54.56	2.3131	21 33 16.9	11.161
10	6 53 52.17	2.4741	27 39 2.8	4.082	10	8 49 13.21	2.3087	21 22 3.4	11.288
11	6 56 20.57	2.4726	27 34 52.9	4.248	11	8 51 31.60	2.3043	21 10 42.4	11.413
12	6 58 48.88	2.4709	27 30 33.0	4.415	12	8 53 49.72	2.2998	20 59 13.9	11.537
13	7 1 17.08	2.4691	27 26 3.1	4.582	13	8 56 7.58	2.2954	20 47 38.0	11.659
14	7 3 45.17	2.4672	27 21 23.2	4.748	14	8 58 25.17	2.2910	20 35 54.8	11.781
15	7 6 13.14	2.4652	27 16 33.3	4.914	15	9 0 42.50	2.2866	20 24 4.3	11.901
16	7 8 40.99	2.4630	27 11 33.5	5.079	16	9 2 59.56	2.2822	20 12 6.7	12.020
17	7 11 8.70	2.4608	27 6 23.8	5.243	17	9 5 16.36	2.2778	20 0 1.9	12.138
18	7 13 36.28	2.4585	27 1 4.3	5.408	18	9 7 32.90	2.2736	19 47 50.1	12.255
19	7 16 3.72	2.4561	26 55 34.9	5.572	19	9 9 49.19	2.2692	19 35 31.3	12.370
20	7 18 31.01	2.4535	26 49 55.7	5.734	20	9 12 5.21	2.2648	19 23 5.7	12.483
21	7 20 58.14	2.4509	26 44 6.8	5.896	21	9 14 20.97	2.2606	19 10 33.3	12.597
22	7 23 25.11	2.4482	26 38 8.2	6.058	22	9 16 36.48	2.2563	18 57 54.1	12.709
23	7 25 51.92	2.4453	N.26 31 59.9	6.219	23	9 18 51.73	2.2521	N.18 45 8.2	12.819
TUESDAY 18.					THURSDAY 20.				
0	7 28 18.56	2.4425	N.26 25 41.9	6.380	0	9 21 6.73	2.2479	N.18 32 15.8	12.928
1	7 30 45.02	2.4395	26 19 14.3	6.539	1	9 23 21.48	2.2438	18 19 16.9	13.035
2	7 33 11.30	2.4364	26 12 37.2	6.698	2	9 25 35.98	2.2396	18 6 11.6	13.141
3	7 35 37.39	2.4332	26 5 50.6	6.856	3	9 27 50.23	2.2354	17 53 0.0	13.246
4	7 38 3.29	2.4300	25 58 54.5	7.013	4	9 30 4.23	2.2313	17 39 42.1	13.350
5	7 40 28.99	2.4267	25 51 49.0	7.170	5	9 32 17.99	2.2273	17 26 18.0	13.452
6	7 42 54.49	2.4233	25 44 34.1	7.326	6	9 34 31.51	2.2234	17 12 47.8	13.553
7	7 45 19.78	2.4198	25 37 9.9	7.480	7	9 36 44.80	2.2195	16 59 11.6	13.653
8	7 47 44.87	2.4163	25 29 36.5	7.634	8	9 38 57.85	2.2155	16 45 29.4	13.752
9	7 50 9.74	2.4127	25 21 53.8	7.788	9	9 41 10.66	2.2117	16 31 41.3	13.850
10	7 52 34.39	2.4090	25 14 1.9	7.940	10	9 43 23.25	2.2079	16 17 47.4	13.945
11	7 54 58.82	2.4053	25 6 1.0	8.091	11	9 45 35.61	2.2041	16 3 47.9	14.039
12	7 57 23.03	2.4016	24 57 51.0	8.242	12	9 47 47.74	2.2003	15 49 42.7	14.132
13	7 59 47.01	2.3977	24 49 32.0	8.392	13	9 49 59.65	2.1967	15 35 32.0	14.224
14	8 2 10.75	2.3938	24 41 4.0	8.540	14	9 52 11.35	2.1932	15 21 15.8	14.315
15	8 4 34.26	2.3898	24 32 27.2	8.687	15	9 54 22.83	2.1896	15 6 54.2	14.404
16	8 6 57.53	2.3858	24 23 41.6	8.833	16	9 56 34.10	2.1861	14 52 27.3	14.492
17	8 9 20.56	2.3818	24 14 47.2	8.979	17	9 58 45.16	2.1827	14 37 55.2	14.578
18	8 11 43.34	2.3777	24 5 44.1	9.124	18	10 0 56.02	2.1792	14 23 17.9	14.663
19	8 14 5.88	2.3736	23 56 32.3	9.267	19	10 3 6.67	2.1759	14 8 35.6	14.747
20	8 16 28.17	2.3694	23 47 12.0	9.410	20	10 5 17.13	2.1727	13 53 48.3	14.829
21	8 18 50.21	2.3652	23 37 43.1	9.552	21	10 7 27.39	2.1694	13 38 56.1	14.910
22	8 21 12.00	2.3610	23 28 5.8	9.692	22	10 9 37.47	2.1664	13 23 59.1	14.990
23	8 23 33.53	2.3568	23 18 20.1	9.831	23	10 11 47.36	2.1633	13 8 57.3	15.068
24	8 25 54.81	2.3525	N.23 8 26.1	9.968	24	10 13 57.06	2.1603	N.12 53 50.9	15.145

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 25.					THURSDAY 27.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	13 39 46.16	2.2600	S. 13 35 37.1	15.532	0	15 34 29.05	2.5192	S. 23 58 29.4	9.741
1	13 42 1.91	2.2649	13 51 6.7	15.453	1	15 37 0.34	2.5239	24 8 9.0	9.579
2	13 44 17.95	2.2699	14 6 31.5	15.373	2	15 39 31.92	2.5286	24 17 38.9	9.416
3	13 46 34.30	2.2750	14 21 51.5	15.292	3	15 42 3.77	2.5331	24 26 58.9	9.252
4	13 48 50.95	2.2801	14 37 6.6	15.209	4	15 44 35.89	2.5375	24 36 9.1	9.087
5	13 51 7.91	2.2853	14 52 16.6	15.123	5	15 47 8.27	2.5419	24 45 9.3	8.920
6	13 53 25.19	2.2906	15 7 21.4	15.036	6	15 49 40.92	2.5462	24 53 59.5	8.752
7	13 55 42.78	2.2958	15 22 20.9	14.948	7	15 52 13.82	2.5504	25 2 39.5	8.582
8	13 58 0.68	2.3011	15 37 15.1	14.857	8	15 54 46.97	2.5545	25 11 9.3	8.412
9	14 0 18.91	2.3064	15 52 3.7	14.763	9	15 57 20.36	2.5584	25 19 28.9	8.241
10	14 2 37.45	2.3118	16 6 46.7	14.669	10	15 59 53.98	2.5622	25 27 38.2	8.068
11	14 4 56.32	2.3172	16 21 24.0	14.573	11	16 2 27.83	2.5660	25 35 37.0	7.893
12	14 7 15.52	2.3227	16 35 55.4	14.474	12	16 5 1.90	2.5697	25 43 25.4	7.718
13	14 9 35.04	2.3282	16 50 20.9	14.374	13	16 7 36.19	2.5732	25 51 3.2	7.543
14	14 11 54.90	2.3337	17 4 40.3	14.272	14	16 10 10.68	2.5765	25 58 30.5	7.367
15	14 14 15.08	2.3392	17 18 53.5	14.168	15	16 12 45.37	2.5798	26 5 47.2	7.188
16	14 16 35.60	2.3448	17 33 9.4	14.062	16	16 15 20.26	2.5830	26 12 53.1	7.008
17	14 18 56.45	2.3503	17 47 0.9	13.954	17	16 17 55.33	2.5859	26 19 48.2	6.829
18	14 21 17.64	2.3560	18 0 54.9	13.844	18	16 20 30.57	2.5888	26 26 32.6	6.649
19	14 23 39.17	2.3617	18 14 42.2	13.732	19	16 23 5.98	2.5915	26 33 6.1	6.468
20	14 26 1.04	2.3673	18 28 22.8	13.620	20	16 25 41.55	2.5941	26 39 28.7	6.285
21	14 28 23.25	2.3729	18 41 56.6	13.505	21	16 28 17.27	2.5966	26 45 40.3	6.102
22	14 30 45.79	2.3786	18 55 23.4	13.388	22	16 30 53.14	2.5989	26 51 41.0	5.919
23	14 33 8.68	2.3842	S. 19 8 43.1	13.268	23	16 33 29.14	2.6010	S. 26 57 30.6	5.735
WEDNESDAY 26.					FRIDAY 28.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	14 35 31.90	2.3898	S. 19 21 55.6	13.148	0	16 36 5.26	2.6030	S. 27 3 9.2	5.551
1	14 37 55.46	2.3956	19 35 0.8	13.026	1	16 38 41.50	2.6049	27 8 36.7	5.365
2	14 40 19.37	2.4013	19 47 58.7	12.902	2	16 41 17.85	2.6066	27 13 53.9	5.178
3	14 42 43.62	2.4070	20 0 49.0	12.775	3	16 43 54.29	2.6081	27 18 58.1	4.992
4	14 45 8.21	2.4127	20 13 31.7	12.647	4	16 46 30.82	2.6095	27 23 52.0	4.805
5	14 47 33.14	2.4183	20 26 6.7	12.518	5	16 49 7.43	2.6108	27 28 34.7	4.618
6	14 49 58.40	2.4238	20 38 33.8	12.387	6	16 51 44.11	2.6118	27 33 6.1	4.430
7	14 52 24.00	2.4295	20 50 53.1	12.254	7	16 54 20.85	2.6127	27 37 26.3	4.242
8	14 54 49.94	2.4352	21 3 4.3	12.118	8	16 56 57.63	2.6134	27 41 35.2	4.054
9	14 57 16.22	2.4408	21 15 7.3	11.982	9	16 59 34.46	2.6141	27 45 32.8	3.866
10	14 59 42.83	2.4463	21 27 2.1	11.844	10	17 2 11.32	2.6144	27 49 19.1	3.677
11	15 2 9.77	2.4518	21 38 48.6	11.705	11	17 4 48.19	2.6147	27 52 54.0	3.488
12	15 4 37.04	2.4573	21 50 26.7	11.563	12	17 7 25.08	2.6148	27 56 17.6	3.299
13	15 7 4.64	2.4627	22 1 56.2	11.419	13	17 10 1.97	2.6147	27 59 29.9	3.110
14	15 9 32.56	2.4681	22 13 17.0	11.274	14	17 12 38.84	2.6143	28 2 30.8	2.920
15	15 12 0.81	2.4735	22 24 29.1	11.128	15	17 15 15.69	2.6139	28 5 20.3	2.731
16	15 14 29.38	2.4788	22 35 32.4	10.981	16	17 17 52.51	2.6133	28 7 58.5	2.542
17	15 16 58.26	2.4840	22 46 26.8	10.831	17	17 20 29.29	2.6126	28 10 25.4	2.354
18	15 19 27.46	2.4892	22 57 12.1	10.679	18	17 23 6.02	2.6117	28 12 41.0	2.165
19	15 21 56.97	2.4944	23 7 48.3	10.527	19	17 25 42.69	2.6105	28 14 45.2	1.976
20	15 24 26.79	2.4995	23 18 15.3	10.372	20	17 28 19.28	2.6092	28 16 38.1	1.788
21	15 26 56.91	2.5045	23 28 33.0	10.217	21	17 30 55.79	2.6078	28 18 19.7	1.600
22	15 29 27.33	2.5094	23 38 41.3	10.059	22	17 33 32.21	2.6062	28 19 50.1	1.412
23	15 31 58.04	2.5143	23 48 40.1	9.901	23	17 36 8.53	2.6043	28 21 9.2	1.224
24	15 34 29.05	2.5192	S. 23 58 29.4	9.741	24	17 38 44.73	2.6023	S. 28 22 17.0	1.037

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semidiameter Passing Meridian.	Equation of Time, to be Subtracted from		Diff. for Hour
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semidiameter.	Added to Apparent Time.				
		h m s	s	° ' "	"	' "	s	m s	s		
Mon.	1	16 27 54.85	10.791	S.21 45 58.2	-23.68	16 15.30	70.22	11 0.20	0.932		
Tues.	2	16 32 14.17	10.817	21 55 14.0	22.63	16 15.46	70.31	10 37.50	0.959		
Wed.	3	16 36 34.10	10.843	22 4 4.4	21.57	16 15.61	70.39	10 14.19	0.984		
Thur.	4	16 40 54.63	10.867	22 12 29.3	-20.50	16 15.76	70.47	9 50.29	1.008		
Fri.	5	16 45 15.72	10.890	22 20 28.4	19.42	16 15.90	70.55	9 25.82	1.031		
Sat.	6	16 49 37.36	10.912	22 28 1.3	18.32	16 16.04	70.62	9 0.81	1.053		
SUN.	7	16 53 59.51	10.933	22 35 7.9	-17.22	16 16.18	70.69	8 35.29	1.073		
Mon.	8	16 58 22.16	10.953	22 41 48.0	16.11	16 16.31	70.76	8 9.28	1.093		
Tues.	9	17 2 45.26	10.971	22 48 1.3	14.99	16 16.44	70.83	7 42.80	1.112		
Wed.	10	17 7 8.79	10.989	22 53 47.7	-13.86	16 16.56	70.89	7 15.89	1.129		
Thur.	11	17 11 32.74	11.006	22 59 6.9	12.73	16 16.67	70.95	6 48.57	1.146		
Fri.	12	17 15 57.08	11.022	23 3 58.9	11.59	16 16.78	71.00	6 20.87	1.161		
Sat.	13	17 20 21.78	11.036	23 8 23.5	-10.45	16 16.88	71.04	5 52.82	1.176		
SUN.	14	17 24 46.80	11.049	23 12 20.5	9.30	16 16.98	71.08	5 24.43	1.189		
Mon.	15	17 29 12.13	11.061	23 15 49.8	8.14	16 17.07	71.12	4 55.74	1.201		
Tues.	16	17 33 37.73	11.072	23 18 51.2	- 6.97	16 17.16	71.15	4 26.78	1.212		
Wed.	17	17 38 3.58	11.081	23 21 24.7	5.81	16 17.24	71.18	3 57.57	1.221		
Thur.	18	17 42 29.64	11.089	23 23 30.2	4.64	16 17.31	71.21	3 28.14	1.230		
Fri.	19	17 46 55.89	11.096	23 25 7.6	- 3.47	16 17.38	71.23	2 58.53	1.237		
Sat.	20	17 51 22.30	11.103	23 26 16.8	2.30	16 17.44	71.24	2 28.76	1.242		
SUN.	21	17 55 48.83	11.107	23 26 57.8	- 1.12	16 17.50	71.25	1 58.88	1.246		
Mon.	22	18 0 15.44	11.110	23 27 10.4	+ 0.07	16 17.56	71.26	1 28.91	1.249		
Tues.	23	18 4 42.11	11.111	23 26 54.6	1.25	16 17.61	71.26	0 58.89	1.251		
Wed.	24	18 9 8.79	11.110	23 26 10.6	2.42	16 17.65	71.25	0 28.85	1.251		
Thur.	25	18 13 35.44	11.109	23 24 58.2	+ 3.60	16 17.69	71.24	0 1.16	1.249		
Fri.	26	18 18 2.02	11.106	23 23 17.5	4.78	16 17.73	71.23	0 31.11	1.245		
Sat.	27	18 22 28.50	11.101	23 21 8.5	5.96	16 17.76	71.22	1 0.95	1.240		
SUN.	28	18 26 54.85	11.094	23 18 31.3	+ 7.13	16 17.79	71.20	1 30.65	1.233		
Mon.	29	18 31 21.02	11.086	23 15 26.0	8.30	16 17.81	71.18	2 0.17	1.225		
Tues.	30	18 35 46.96	11.076	23 11 52.6	9.47	16 17.83	71.15	2 29.48	1.215		
Wed.	31	18 40 12.64	11.064	23 7 51.3	10.63	16 17.85	71.11	2 58.54	1.204		
Thur.	32	18 44 38.04	11.051	S.23 3 22.2	+11.79	16 17.86	71.07	3 27.30	1.191		

NOTE.—The mean time of semidiameter passing the meridian may be found by subtracting 0^s.19 from the sidereal time.
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time to be Added to		Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.				
		Apparent Right Ascension.			Diff. for 1 Hour.	Apparent Declination.			Diff. for 1 Hour.			Subtracted from Mean Time.			
		h	m	s	s	°	'	"	"	m	s	s	h	m	s
Mon.	1	16	27	56.82	10.789	S. 21	46	2.5	-23.67	11	0.03	0.932	16	38	56.86
Tues.	2	16	32	16.08	10.815	21	55	18.0	22.62	10	37.33	0.959	16	42	53.41
Wed.	3	16	36	35.95	10.840	22	4	8.1	21.56	10	14.02	0.984	16	46	49.97
Thur.	4	16	40	56.41	10.864	22	12	32.7	-20.49	9	50.12	1.008	16	50	46.53
Fri.	5	16	45	17.43	10.887	22	20	31.5	19.40	9	25.66	1.031	16	54	43.09
Sat.	6	16	49	39.00	10.909	22	28	4.1	18.31	9	0.66	1.053	16	58	39.65
SUN.	7	16	54	1.08	10.930	22	35	10.4	-17.21	8	35.14	1.073	17	2	36.21
Mon.	8	16	58	23.64	10.950	22	41	50.2	16.10	8	9.13	1.093	17	6	32.77
Tues.	9	17	2	46.66	10.968	22	48	3.2	14.98	7	42.66	1.112	17	10	29.32
Wed.	10	17	7	10.12	10.986	22	53	49.3	-13.86	7	15.76	1.129	17	14	25.88
Thur.	11	17	11	34.00	11.003	22	59	8.3	12.73	6	48.45	1.146	17	18	22.44
Fri.	12	17	15	58.25	11.018	23	4	0.1	11.59	6	20.75	1.161	17	22	19.00
Sat.	13	17	20	22.86	11.032	23	8	24.5	-10.44	5	52.70	1.176	17	26	15.56
SUN.	14	17	24	47.80	11.045	23	12	21.3	9.29	5	24.32	1.189	17	30	12.12
Mon.	15	17	29	13.04	11.057	23	15	50.4	8.13	4	55.64	1.201	17	34	8.68
Tues.	16	17	33	38.55	11.068	23	18	51.7	- 6.97	4	26.69	1.212	17	38	5.24
Wed.	17	17	38	4.31	11.078	23	21	25.1	5.81	3	57.49	1.221	17	42	1.80
Thur.	18	17	42	30.28	11.086	23	23	30.5	4.64	3	28.07	1.230	17	45	58.36
Fri.	19	17	46	56.44	11.093	23	25	7.8	- 3.47	2	58.47	1.237	17	49	54.92
Sat.	20	17	51	22.76	11.099	23	26	16.9	2.29	2	28.71	1.242	17	53	51.47
SUN.	21	17	55	49.20	11.103	23	26	57.8	- 1.11	1	58.84	1.246	17	57	48.03
Mon.	22	18	0	15.72	11.106	23	27	10.4	+ 0.07	1	28.88	1.249	18	1	44.59
Tues.	23	18	4	42.29	11.108	23	26	54.7	1.25	0	58.87	1.251	18	5	41.15
Wed.	24	18	9	8.87	11.107	23	26	10.6	2.43	0	28.84	1.251	18	9	37.71
Thur.	25	18	13	35.43	11.105	23	24	58.2	+ 3.61	0	1.16	1.249	18	13	34.27
Fri.	26	18	18	1.93	11.102	23	23	17.5	4.79	0	31.10	1.245	18	17	30.83
Sat.	27	18	22	28.32	11.097	23	21	8.6	5.96	1	0.93	1.240	18	21	27.39
SUN.	28	18	26	54.57	11.090	23	18	31.5	+ 7.13	1	30.62	1.233	18	25	23.95
Mon.	29	18	31	20.65	11.082	23	15	26.3	8.30	2	0.13	1.225	18	29	20.51
Tues.	30	18	35	46.50	11.072	23	11	53.0	9.47	2	29.43	1.215	18	33	17.07
Wed.	31	18	40	12.10	11.061	23	7	51.8	10.63	2	58.48	1.204	18	37	13.63
Thur.	32	18	44	37.41	11.048	S. 23	3	22.9	+11.78	3	27.23	1.191	18	41	10.18

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour,
+9^s.8565.
(Table III.)

AT GREENWICH MEAN NOON.											
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.		
		True Longitude.			Diff. for 1 Hour.	Latitude.					
		°	'	"						'	"
1	335	248	43	1.3	42	13.2	152.15	−0.51	9.993 8123	−29.4	h m s 7 19 50.89
2	336	249	43	53.4	43	5.1	152.19	0.44	9.993 7425	28.8	7 15 54.98
3	337	250	44	46.4	43	57.9	152.23	0.35	9.993 6743	28.1	7 11 59.06
4	338	251	45	40.2	44	51.6	152.26	−0.25	9.993 6078	−27.3	7 8 3.15
5	339	252	46	34.8	45	46.1	152.29	0.14	9.993 5431	26.5	7 4 7.24
6	340	253	47	30.3	46	41.3	152.32	−0.02	9.993 4804	25.7	7 0 11.32
7	341	254	48	26.4	47	37.2	152.35	+0.11	9.993 4197	−24.8	6 56 15.41
8	342	255	49	23.2	48	33.8	152.38	0.23	9.993 3612	23.9	6 52 19.50
9	343	256	50	20.8	49	31.2	152.41	0.34	9.993 3051	22.9	6 48 23.59
10	344	257	51	19.0	50	29.3	152.44	+0.43	9.993 2514	−21.9	6 44 27.67
11	345	258	52	17.9	51	28.0	152.47	0.49	9.993 2002	20.8	6 40 31.76
12	346	259	53	17.6	52	27.4	152.50	0.53	9.993 1515	19.7	6 36 35.85
13	347	260	54	17.9	53	27.6	152.53	+0.54	9.993 1055	−18.6	6 32 39.93
14	348	261	55	19.0	54	28.5	152.56	0.52	9.993 0622	17.5	6 28 44.02
15	349	262	56	20.9	55	30.2	152.59	0.48	9.993 0217	16.3	6 24 48.11
16	350	263	57	23.6	56	32.6	152.62	+0.40	9.992 9839	−15.2	6 20 52.20
17	351	264	58	27.1	57	35.9	152.66	0.31	9.992 9488	14.1	6 16 56.28
18	352	265	59	31.4	58	40.1	152.70	0.20	9.992 9163	13.0	6 13 0.37
19	353	266	60	36.6	59	45.1	152.73	+0.06	9.992 8862	−12.0	6 9 4.46
20	354	268	1	42.7	0	50.9	152.77	−0.07	9.992 8585	11.1	6 5 8.54
21	355	269	2	49.5	1	57.5	152.80	0.20	9.992 8330	10.2	6 1 12.63
22	356	270	3	57.1	3	4.9	152.83	−0.31	9.992 8096	−9.4	5 57 16.72
23	357	271	5	5.4	4	13.1	152.86	0.40	9.992 7882	8.6	5 53 20.80
24	358	272	6	14.4	5	21.9	152.89	0.47	9.992 7686	7.8	5 49 24.89
25	359	273	7	23.9	6	31.2	152.91	−0.52	9.992 7507	−7.1	5 45 28.98
26	360	274	8	33.9	7	41.0	152.93	0.53	9.992 7345	6.4	5 41 33.06
27	361	275	9	44.3	8	51.1	152.94	0.51	9.992 7200	5.7	5 37 37.15
28	362	276	10	54.8	10	1.5	152.94	−0.47	9.992 7071	−5.0	5 33 41.24
29	363	277	12	5.6	11	12.0	152.95	0.40	9.992 6958	4.3	5 29 45.32
30	364	278	13	16.4	12	22.6	152.95	0.30	9.992 6863	3.6	5 25 49.41
31	365	279	14	27.1	13	33.1	152.94	0.19	9.992 6785	2.8	5 21 53.50
32	366	280	15	37.7	14	43.5	152.94	−0.07	9.992 6726	−2.0	5 17 57.58

NOTE.—The longitudes in the column λ are referred to the true equinox of their own date, while those in the column λ' are referred to the mean equinox of the beginning of the Besselian fictitious year.

Diff. for 1 Hour, −9^s.8296. (Table II.)

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 27.5	15 21.3	56 38.12	−1.938	56 15.29	−1.859	3 6.5	2.24	3.4
2	15 15.4	15 9.9	55 53.60	1.749	55 33.41	1.610	3 57.8	2.04	4.4
3	15 4.9	15 0.4	55 15.05	1.446	54 58.77	1.264	4 44.5	1.86	5.4
4	14 56.6	14 53.5	54 44.78	−1.067	54 33.22	−0.858	5 27.5	1.73	6.4
5	14 51.0	14 49.3	54 24.20	0.644	54 17.81	−0.422	6 7.8	1.64	7.4
6	14 48.3	14 48.0	54 14.08	−0.201	54 12.98	+0.016	6 46.8	1.61	8.4
7	14 48.3	14 49.4	54 14.44	+0.226	54 18.36	+0.426	7 25.6	1.63	9.4
8	14 51.1	14 53.4	54 24.62	0.615	54 33.08	0.791	8 5.5	1.70	10.4
9	14 56.3	14 59.6	54 43.54	0.949	54 55.79	1.089	8 47.6	1.82	11.4
10	15 3.4	15 7.5	55 9.59	+1.206	55 24.66	+1.301	9 33.1	1.98	12.4
11	15 11.9	15 16.4	55 40.73	1.372	55 57.50	1.418	10 22.8	2.16	13.4
12	15 21.1	15 25.8	56 14.69	1.441	56 32.01	1.440	11 16.7	2.33	14.4
13	15 30.5	15 35.1	56 49.16	+1.415	57 5.91	+1.373	12 14.2	2.44	15.4
14	15 39.5	15 43.6	57 22.03	1.310	57 37.30	1.233	13 13.2	2.46	16.4
15	15 47.5	15 51.1	57 51.58	1.145	58 4.75	1.049	14 11.5	2.39	17.4
16	15 54.4	15 57.3	58 16.74	+0.949	58 27.53	+0.848	15 7.3	2.26	18.4
17	15 59.9	16 2.2	58 37.10	0.747	58 45.47	0.649	15 59.8	2.12	19.4
18	16 4.2	16 5.8	58 52.68	0.552	58 58.75	0.460	16 49.4	2.02	20.4
19	16 7.2	16 8.3	59 3.75	+0.373	59 7.71	+0.287	17 37.2	1.97	21.4
20	16 9.1	16 9.6	59 10.64	0.201	59 12.52	+0.111	18 24.6	1.98	22.4
21	16 9.8	16 9.7	59 13.30	+0.018	59 12.94	−0.080	19 12.8	2.05	23.4
22	16 9.2	16 8.5	59 11.34	−0.189	59 8.38	−0.306	20 3.4	2.17	24.4
23	16 7.3	16 5.6	59 3.98	0.429	58 58.06	0.560	20 57.3	2.32	25.4
24	16 3.6	16 1.1	58 50.52	0.698	58 41.31	0.838	21 54.7	2.45	26.4
25	15 58.1	15 54.7	58 30.41	−0.978	58 17.86	−1.113	22 54.5	2.52	27.4
26	15 50.9	15 46.6	58 3.75	1.237	57 48.22	1.349	23 54.7	2.48	28.4
27	15 42.0	15 37.2	57 31.45	1.442	57 13.70	1.512	0	.	29.4
28	15 32.2	15 27.0	56 55.26	−1.557	56 36.42	−1.577	0 52.6	2.34	0.9
29	15 21.9	15 16.8	56 17.52	1.569	55 58.90	1.530	1 46.5	2.15	1.9
30	15 11.9	15 7.3	55 40.92	1.462	55 23.90	1.370	2 35.8	1.96	2.9
31	15 3.0	14 59.1	55 8.14	1.253	54 53.92	1.113	3 20.8	1.80	3.9
32	14 55.7	14 52.9	54 41.52	−0.950	54 31.18	−0.770	4 2.6	1.69	4.9

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 1.					WEDNESDAY 3.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	19 38 36.57	2.3483	S. 25 51 55.7	6.863	0	21 22 42.41	1.9987	S. 18 15 41.1	11.610
1	19 40 57.24	2.3408	25 44 59.9	6.996	1	21 24 42.14	1.9923	18 4 2.5	11.677
2	19 43 17.46	2.3333	25 37 56.2	7.127	2	21 26 41.49	1.9861	17 52 19.9	11.742
3	19 45 37.23	2.3258	25 30 44.7	7.257	3	21 28 40.47	1.9799	17 40 33.5	11.806
4	19 47 56.55	2.3183	25 23 25.4	7.386	4	21 30 39.08	1.9738	17 28 43.2	11.869
5	19 50 15.42	2.3107	25 15 58.4	7.513	5	21 32 37.33	1.9678	17 16 49.2	11.931
6	19 52 33.83	2.3031	25 8 23.9	7.638	6	21 34 35.22	1.9618	17 4 51.5	11.992
7	19 54 51.79	2.2955	25 0 41.9	7.761	7	21 36 32.75	1.9559	16 52 50.2	12.052
8	19 57 9.29	2.2878	24 52 52.6	7.883	8	21 38 29.93	1.9501	16 40 45.3	12.111
9	19 59 26.33	2.2803	24 44 55.9	8.005	9	21 40 26.76	1.9443	16 28 36.9	12.168
10	20 1 42.92	2.2727	24 36 52.0	8.124	10	21 42 23.25	1.9387	16 16 25.1	12.224
11	20 3 59.05	2.2650	24 28 41.0	8.242	11	21 44 19.40	1.9330	16 4 10.0	12.280
12	20 6 14.72	2.2573	24 20 23.0	8.358	12	21 46 15.21	1.9274	15 51 51.5	12.335
13	20 8 29.93	2.2497	24 11 58.0	8.473	13	21 48 10.69	1.9219	15 39 29.8	12.388
14	20 10 44.68	2.2420	24 3 26.2	8.586	14	21 50 5.84	1.9166	15 27 4.9	12.441
15	20 12 58.97	2.2344	23 54 47.6	8.698	15	21 52 0.68	1.9113	15 14 36.9	12.492
16	20 15 12.81	2.2268	23 46 2.4	8.809	16	21 53 55.20	1.9060	15 2 5.9	12.542
17	20 17 26.19	2.2192	23 37 10.6	8.918	17	21 55 49.40	1.9008	14 49 31.8	12.592
18	20 19 39.11	2.2115	23 28 12.3	9.025	18	21 57 43.29	1.8957	14 36 54.8	12.640
19	20 21 51.57	2.2039	23 19 7.6	9.131	19	21 59 36.88	1.8907	14 24 15.0	12.688
20	20 24 3.58	2.1963	23 9 56.6	9.236	20	22 1 30.17	1.8857	14 11 32.3	12.735
21	20 26 15.13	2.1888	23 0 39.3	9.339	21	22 3 23.17	1.8808	13 58 46.8	12.781
22	20 28 26.23	2.1813	22 51 15.9	9.441	22	22 5 15.88	1.8761	13 45 58.6	12.825
23	20 30 36.88	2.1737	S. 22 41 46.4	9.541	23	22 7 8.30	1.8713	S. 13 33 7.8	12.868
TUESDAY 2.					THURSDAY 4.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	20 32 47.07	2.1662	S. 22 32 11.0	9.639	0	22 9 0.44	1.8667	S. 13 20 14.4	12.911
1	20 34 56.82	2.1587	22 22 29.7	9.737	1	22 10 52.31	1.8622	13 7 18.5	12.953
2	20 37 6.12	2.1512	22 12 42.6	9.833	2	22 12 43.90	1.8576	12 54 20.0	12.995
3	20 39 14.97	2.1438	22 2 49.7	9.928	3	22 14 35.22	1.8532	12 41 19.1	13.035
4	20 41 23.38	2.1363	21 52 51.2	10.021	4	22 16 26.28	1.8489	12 28 15.8	13.074
5	20 43 31.35	2.1292	21 42 47.2	10.112	5	22 18 17.09	1.8447	12 15 10.2	13.112
6	20 45 38.88	2.1218	21 32 37.7	10.203	6	22 20 7.64	1.8404	12 2 2.3	13.150
7	20 47 45.97	2.1146	21 22 22.8	10.293	7	22 21 57.94	1.8363	11 48 52.2	13.187
8	20 49 52.63	2.1073	21 12 2.6	10.381	8	22 23 48.00	1.8323	11 35 39.9	13.223
9	20 51 58.85	2.1002	21 1 37.1	10.467	9	22 25 37.82	1.8283	11 22 25.4	13.258
10	20 54 4.65	2.0931	20 51 6.5	10.552	10	22 27 27.40	1.8244	11 9 8.9	13.292
11	20 56 10.02	2.0860	20 40 30.8	10.636	11	22 29 16.75	1.8207	10 55 50.3	13.326
12	20 58 14.97	2.0790	20 29 50.2	10.718	12	22 31 5.88	1.8170	10 42 29.8	13.358
13	21 0 19.50	2.0720	20 19 4.6	10.800	13	22 32 54.79	1.8133	10 29 7.3	13.390
14	21 2 23.61	2.0650	20 8 14.2	10.879	14	22 34 43.48	1.8098	10 15 43.0	13.421
15	21 4 27.30	2.0581	19 57 19.1	10.958	15	22 36 31.97	1.8064	10 2 16.8	13.452
16	21 6 30.58	2.0513	19 46 19.3	11.036	16	22 38 20.25	1.8030	9 48 48.8	13.481
17	21 8 33.45	2.0445	19 35 14.9	11.112	17	22 40 8.33	1.7997	9 35 19.1	13.509
18	21 10 35.92	2.0378	19 24 5.9	11.186	18	22 41 56.21	1.7964	9 21 47.7	13.537
19	21 12 37.99	2.0312	19 12 52.5	11.260	19	22 43 43.90	1.7933	9 8 14.6	13.565
20	21 14 39.66	2.0245	19 1 34.7	11.333	20	22 45 31.41	1.7903	8 54 39.9	13.591
21	21 16 40.93	2.0179	18 50 12.6	11.404	21	22 47 18.73	1.7873	8 41 3.7	13.617
22	21 18 41.81	2.0114	18 38 46.2	11.474	22	22 49 5.88	1.7844	8 27 25.9	13.642
23	21 20 42.30	2.0050	18 27 15.7	11.542	23	22 50 52.86	1.7816	8 13 46.7	13.666
24	21 22 42.41	1.9987	S. 18 15 41.1	11.610	24	22 52 39.67	1.7788	S. 8 0 6.0	13.689

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
FRIDAY 5.					SUNDAY 7.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	22 52 39.67	1.7788	S. 8 0 6.0	13.689	0	0 16 25.23	1.7419	N. 3 11 11.9	14.032
1	22 54 26.32	1.7762	7 46 24.0	13.712	1	0 18 9.78	1.7431	3 25 13.6	14.023
2	22 56 12.81	1.7736	7 32 40.6	13.734	2	0 19 54.40	1.7443	3 39 14.7	14.013
3	22 57 59.15	1.7712	7 18 55.9	13.756	3	0 21 39.10	1.7457	3 53 15.2	14.003
4	22 59 45.35	1.7687	7 5 9.9	13.777	4	0 23 23.88	1.7471	4 7 15.1	13.993
5	23 1 31.40	1.7663	6 51 22.7	13.796	5	0 25 8.75	1.7486	4 21 14.4	13.982
6	23 3 17.31	1.7641	6 37 34.4	13.815	6	0 26 53.71	1.7502	4 35 12.9	13.969
7	23 5 3.09	1.7619	6 23 44.9	13.834	7	0 28 38.77	1.7518	4 49 10.7	13.957
8	23 6 48.74	1.7598	6 9 54.3	13.852	8	0 30 23.93	1.7536	5 3 7.7	13.943
9	23 8 34.27	1.7578	5 56 2.7	13.868	9	0 32 9.20	1.7554	5 17 3.9	13.929
10	23 10 19.68	1.7559	5 42 10.1	13.885	10	0 33 54.58	1.7573	5 30 59.2	13.914
11	23 12 4.98	1.7541	5 28 16.5	13.901	11	0 35 40.08	1.7593	5 44 53.6	13.899
12	23 13 50.17	1.7523	5 14 22.0	13.916	12	0 37 25.69	1.7613	5 58 47.1	13.883
13	23 15 35.26	1.7506	5 0 26.6	13.931	13	0 39 11.43	1.7634	6 12 39.5	13.866
14	23 17 20.24	1.7489	4 46 30.3	13.945	14	0 40 57.30	1.7656	6 26 31.0	13.849
15	23 19 5.13	1.7474	4 32 33.2	13.958	15	0 42 43.30	1.7679	6 40 21.4	13.830
16	23 20 49.93	1.7459	4 18 35.3	13.971	16	0 44 29.45	1.7703	6 54 10.6	13.811
17	23 22 34.64	1.7446	4 4 36.7	13.982	17	0 46 15.74	1.7727	7 7 58.7	13.791
18	23 24 19.28	1.7433	3 50 37.4	13.993	18	0 48 2.17	1.7752	7 21 45.5	13.770
19	23 26 3.84	1.7421	3 36 37.5	14.003	19	0 49 48.76	1.7778	7 35 31.1	13.749
20	23 27 48.33	1.7410	3 22 37.0	14.013	20	0 51 35.51	1.7805	7 49 15.4	13.727
21	23 29 32.76	1.7400	3 8 35.9	14.023	21	0 53 22.42	1.7832	8 2 58.3	13.704
22	23 31 17.13	1.7390	2 54 34.2	14.032	22	0 55 9.49	1.7860	8 16 39.9	13.681
23	23 33 1.44	1.7381	S. 2 40 32.0	14.040	23	0 56 56.74	1.7890	N. 8 30 20.0	13.656
SATURDAY 6.					MONDAY 8.				
0	23 34 45.70	1.7373	S. 2 26 29.4	14.047	0	0 58 44.17	1.7920	N. 8 43 58.6	13.631
1	23 36 29.91	1.7366	2 12 26.4	14.053	1	1 0 31.78	1.7950	8 57 35.7	13.605
2	23 38 14.09	1.7360	1 58 23.0	14.060	2	1 2 19.57	1.7981	9 11 11.2	13.578
3	23 39 58.23	1.7354	1 44 19.2	14.066	3	1 4 7.55	1.8013	9 24 45.1	13.551
4	23 41 42.34	1.7349	1 30 15.1	14.070	4	1 5 55.72	1.8045	9 38 17.3	13.523
5	23 43 26.42	1.7345	1 16 10.8	14.074	5	1 7 44.09	1.8079	9 51 47.8	13.494
6	23 45 10.48	1.7342	1 2 6.2	14.078	6	1 9 32.67	1.8114	10 5 16.6	13.464
7	23 46 54.52	1.7339	0 48 1.5	14.081	7	1 11 21.46	1.8149	10 18 43.5	13.433
8	23 48 38.55	1.7338	0 33 56.5	14.083	8	1 13 10.46	1.8184	10 32 8.6	13.402
9	23 50 22.57	1.7337	0 19 51.5	14.084	9	1 14 59.67	1.8221	10 45 31.7	13.368
10	23 52 6.59	1.7337	S. 0 5 46.4	14.085	10	1 16 49.11	1.8258	10 58 52.8	13.335
11	23 53 50.61	1.7338	N. 0 8 18.7	14.086	11	1 18 38.77	1.8297	11 12 11.9	13.302
12	23 55 34.64	1.7339	0 22 23.9	14.086	12	1 20 28.67	1.8336	11 25 29.0	13.267
13	23 57 18.68	1.7341	0 36 29.0	14.084	13	1 22 18.80	1.8375	11 38 43.9	13.231
14	23 59 2.73	1.7344	0 50 34.0	14.083	14	1 24 9.17	1.8415	11 51 56.7	13.194
15	0 0 46.81	1.7348	1 4 39.0	14.081	15	1 25 59.78	1.8456	12 5 7.2	13.157
16	0 2 30.91	1.7353	1 18 43.8	14.078	16	1 27 50.64	1.8498	12 18 15.5	13.118
17	0 4 15.04	1.7358	1 32 48.4	14.074	17	1 29 41.75	1.8540	12 31 21.4	13.078
18	0 5 59.21	1.7365	1 46 52.7	14.070	18	1 31 33.12	1.8583	12 44 24.9	13.038
19	0 7 43.42	1.7372	2 0 56.8	14.066	19	1 33 24.75	1.8627	12 57 26.0	12.997
20	0 9 27.67	1.7380	2 15 0.6	14.060	20	1 35 16.65	1.8672	13 10 24.6	12.955
21	0 11 11.97	1.7388	2 29 4.0	14.054	21	1 37 8.81	1.8717	13 23 20.6	12.912
22	0 12 56.33	1.7398	2 43 7.1	14.047	22	1 39 1.25	1.8763	13 36 14.0	12.868
23	0 14 40.75	1.7408	2 57 9.7	14.040	23	1 40 53.97	1.8809	13 49 4.7	12.823
24	0 16 25.23	1.7419	N. 3 11 11.9	14.032	24	1 42 46.96	1.8856	N. 14 1 52.7	12.777

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
TUESDAY 9.					THURSDAY 11.				
0	1 42 46.96	1.8856	N. 14 1 52.7	12.777	0	3 19 53.33	2.1781	N. 23 1 26.8	9.243
1	1 44 40.24	1.8905	14 14 37.9	12.730	1	3 22 4.22	2.1850	23 10 58.3	9.138
2	1 46 33.82	1.8954	14 27 20.3	12.682	2	3 24 15.53	2.1920	23 19 43.4	9.033
3	1 48 27.69	1.9003	14 39 59.7	12.633	3	3 26 27.26	2.1989	23 28 42.2	8.926
4	1 50 21.86	1.9053	14 52 36.2	12.583	4	3 28 39.40	2.2058	23 37 34.5	8.817
5	1 52 16.33	1.9104	15 5 9.6	12.532	5	3 30 51.96	2.2128	23 46 20.2	8.707
6	1 54 11.11	1.9156	15 17 40.0	12.480	6	3 33 4.93	2.2197	23 54 59.3	8.595
7	1 56 6.20	1.9208	15 30 7.2	12.427	7	3 35 18.32	2.2267	24 3 31.6	8.482
8	1 58 1.60	1.9261	15 42 31.2	12.373	8	3 37 32.13	2.2336	24 11 57.1	8.368
9	1 59 57.33	1.9314	15 54 51.9	12.317	9	3 39 46.35	2.2404	24 20 15.7	8.252
10	2 1 53.37	1.9368	16 7 9.2	12.261	10	3 42 0.98	2.2473	24 28 27.3	8.135
11	2 3 49.74	1.9422	16 19 23.2	12.204	11	3 44 16.03	2.2543	24 36 31.9	8.017
12	2 5 46.44	1.9477	16 31 33.7	12.146	12	3 46 31.49	2.2610	24 44 29.3	7.897
13	2 7 43.47	1.9533	16 43 40.7	12.086	13	3 48 47.35	2.2678	24 52 19.5	7.776
14	2 9 40.84	1.9590	16 55 44.0	12.025	14	3 51 3.63	2.2747	25 0 2.4	7.653
15	2 11 38.55	1.9647	17 7 43.7	11.963	15	3 53 20.31	2.2813	25 7 37.8	7.528
16	2 13 36.60	1.9704	17 19 39.6	11.900	16	3 55 37.39	2.2881	25 15 5.8	7.403
17	2 15 35.00	1.9762	17 31 31.7	11.837	17	3 57 54.88	2.2948	25 22 26.2	7.277
18	2 17 33.75	1.9822	17 43 20.0	11.772	18	4 0 12.77	2.3015	25 29 39.0	7.149
19	2 19 32.86	1.9881	17 55 4.3	11.705	19	4 2 31.06	2.3081	25 36 44.1	7.020
20	2 21 32.32	1.9940	18 6 44.6	11.637	20	4 4 49.74	2.3146	25 43 41.4	6.888
21	2 23 32.14	2.0001	18 18 20.8	11.569	21	4 7 8.81	2.3212	25 50 30.7	6.756
22	2 25 32.33	2.0062	18 29 52.9	11.500	22	4 9 28.28	2.3277	25 57 12.1	6.623
23	2 27 32.88	2.0123	N. 18 41 20.8	11.429	23	4 11 48.13	2.3341	N. 26 3 45.5	6.489
WEDNESDAY 10.					FRIDAY 12.				
0	2 29 33.81	2.0186	N. 18 52 44.4	11.357	0	4 14 8.37	2.3405	N. 26 10 10.8	6.353
1	2 31 35.11	2.0248	19 4 3.6	11.283	1	4 16 28.99	2.3468	26 16 27.8	6.215
2	2 33 36.78	2.0310	19 15 18.4	11.208	2	4 18 49.98	2.3530	26 22 36.6	6.077
3	2 35 38.83	2.0373	19 26 28.7	11.132	3	4 21 11.35	2.3593	26 28 37.0	5.937
4	2 37 41.26	2.0437	19 37 34.3	11.056	4	4 23 33.09	2.3653	26 34 29.0	5.795
5	2 39 44.08	2.0502	19 48 35.3	10.978	5	4 25 55.19	2.3714	26 40 12.4	5.652
6	2 41 47.28	2.0566	19 59 31.6	10.898	6	4 28 17.66	2.3774	26 45 47.3	5.509
7	2 43 50.87	2.0631	20 10 23.1	10.817	7	4 30 40.48	2.3833	26 51 13.5	5.364
8	2 45 54.85	2.0697	20 21 9.7	10.735	8	4 33 3.66	2.3892	26 56 31.0	5.218
9	2 47 59.23	2.0762	20 31 51.3	10.652	9	4 35 27.18	2.3949	27 1 39.6	5.070
10	2 50 4.00	2.0828	20 42 27.9	10.567	10	4 37 51.05	2.4006	27 6 39.4	4.922
11	2 52 9.17	2.0895	20 52 59.3	10.481	11	4 40 15.25	2.4061	27 11 30.3	4.772
12	2 54 14.74	2.0962	21 3 25.6	10.394	12	4 42 39.78	2.4116	27 16 12.1	4.621
13	2 56 20.71	2.1028	21 13 46.6	10.306	13	4 45 4.64	2.4171	27 20 44.8	4.469
14	2 58 27.08	2.1096	21 24 2.3	10.216	14	4 47 29.83	2.4224	27 25 8.4	4.317
15	3 0 33.86	2.1164	21 34 12.5	10.124	15	4 49 55.33	2.4276	27 29 22.8	4.163
16	3 2 41.05	2.1232	21 44 17.2	10.032	16	4 52 21.14	2.4327	27 33 27.9	4.007
17	3 4 48.64	2.1300	21 54 16.3	9.938	17	4 54 47.25	2.4377	27 37 23.6	3.850
18	3 6 56.65	2.1368	22 4 9.7	9.843	18	4 57 13.66	2.4426	27 41 9.9	3.692
19	3 9 5.06	2.1437	22 13 57.4	9.747	19	4 59 40.36	2.4473	27 44 46.7	3.534
20	3 11 13.89	2.1506	22 23 39.3	9.648	20	5 2 7.34	2.4520	27 48 14.0	3.375
21	3 13 23.13	2.1574	22 33 15.2	9.549	21	5 4 34.60	2.4567	27 51 31.7	3.214
22	3 15 32.78	2.1643	22 42 45.2	9.449	22	5 7 2.14	2.4612	27 54 39.7	3.053
23	3 17 42.85	2.1712	22 52 9.1	9.347	23	5 9 29.94	2.4654	27 57 38.0	2.891
24	3 19 53.33	2.1781	N. 23 1 26.8	9.243	24	5 11 57.99	2.4697	N. 28 0 26.6	2.728

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SATURDAY 13.					MONDAY 15.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	5 11 57.99	2.4697	N.28 0 26.6	2.728	0	7 12 42.85	2.5059	N.26 53 12.5	5.578
1	5 14 26.29	2.4738	28 3 5.3	2.563	1	7 15 13.12	2.5031	26 47 32.8	5.746
2	5 16 54.84	2.4777	28 5 34.1	2.398	2	7 17 43.22	2.5003	26 41 43.0	5.914
3	5 19 23.62	2.4815	28 7 53.0	2.232	3	7 20 13.15	2.4974	26 35 43.1	6.082
4	5 21 52.62	2.4852	28 10 2.0	2.065	4	7 22 42.91	2.4943	26 29 33.1	6.250
5	5 24 21.84	2.4888	28 12 0.9	1.898	5	7 25 12.48	2.4912	26 23 13.1	6.416
6	5 26 51.27	2.4922	28 13 49.8	1.731	6	7 27 41.86	2.4880	26 16 43.2	6.581
7	5 29 20.90	2.4955	28 15 28.6	1.562	7	7 30 11.04	2.4847	26 10 3.4	6.745
8	5 31 50.73	2.4987	28 16 57.2	1.392	8	7 32 40.02	2.4813	26 3 13.8	6.909
9	5 34 20.75	2.5017	28 18 15.6	1.222	9	7 35 8.79	2.4777	25 56 14.3	7.072
10	5 36 50.94	2.5046	28 19 23.8	1.051	10	7 37 37.34	2.4740	25 49 5.1	7.234
11	5 39 21.30	2.5073	28 20 21.7	0.880	11	7 40 5.67	2.4703	25 41 46.2	7.395
12	5 41 51.82	2.5099	28 21 9.4	0.708	12	7 42 33.78	2.4665	25 34 17.7	7.555
13	5 44 22.49	2.5124	28 21 46.7	0.535	13	7 45 1.65	2.4625	25 26 39.6	7.714
14	5 46 53.31	2.5147	28 22 13.6	0.362	14	7 47 29.28	2.4585	25 18 52.0	7.872
15	5 49 24.26	2.5169	28 22 30.1	0.188	15	7 49 56.67	2.4544	25 10 55.0	8.028
16	5 51 55.34	2.5189	28 22 36.2	+0.015	16	7 52 23.81	2.4502	25 2 48.6	8.184
17	5 54 26.54	2.5208	28 22 31.9	-0.159	17	7 54 50.70	2.4460	24 54 32.9	8.339
18	5 56 57.84	2.5226	28 22 17.1	0.334	18	7 57 17.33	2.4417	24 46 7.9	8.493
19	5 59 29.24	2.5241	28 21 51.8	0.509	19	7 59 43.70	2.4373	24 37 33.7	8.646
20	6 2 0.73	2.5255	28 21 16.0	0.684	20	8 2 9.80	2.4328	24 28 50.4	8.797
21	6 4 32.30	2.5268	28 20 29.7	0.860	21	8 4 35.64	2.4283	24 19 58.1	8.947
22	6 7 3.94	2.5279	28 19 32.8	1.037	22	8 7 1.20	2.4238	24 10 56.8	9.096
23	6 9 35.65	2.5290	N.28 18 25.3	1.212	23	8 9 26.49	2.4191	N.24 1 46.6	9.244
SUNDAY 14.					TUESDAY 16.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	6 12 7.42	2.5298	N.28 17 7.3	1.388	0	8 11 51.49	2.4143	N.23 52 27.5	9.391
1	6 14 39.23	2.5305	28 15 38.7	1.565	1	8 14 16.21	2.4097	23 42 59.7	9.536
2	6 17 11.08	2.5310	28 13 59.5	1.742	2	8 16 40.65	2.4049	23 33 23.2	9.680
3	6 19 42.95	2.5313	28 12 9.7	1.918	3	8 19 4.80	2.4001	23 23 38.1	9.822
4	6 22 14.84	2.5315	28 10 9.4	2.093	4	8 21 28.66	2.3952	23 13 44.5	9.964
5	6 24 46.73	2.5316	28 7 58.5	2.271	5	8 23 52.22	2.3903	23 3 42.4	10.105
6	6 27 18.63	2.5316	28 5 36.9	2.447	6	8 26 15.49	2.3853	22 53 31.9	10.245
7	6 29 50.52	2.5313	28 3 4.8	2.623	7	8 28 38.46	2.3803	22 43 13.2	10.381
8	6 32 22.39	2.5309	28 0 22.1	2.800	8	8 31 1.13	2.3753	22 32 46.2	10.518
9	6 34 54.23	2.5304	27 57 28.8	2.976	9	8 33 23.50	2.3703	22 22 11.1	10.653
10	6 37 26.04	2.5298	27 54 25.0	3.152	10	8 35 45.56	2.3652	22 11 27.9	10.786
11	6 39 57.81	2.5290	27 51 10.6	3.328	11	8 38 7.32	2.3601	22 0 36.8	10.917
12	6 42 29.52	2.5279	27 47 45.7	3.503	12	8 40 28.77	2.3549	21 49 37.8	11.048
13	6 45 1.16	2.5268	27 44 10.3	3.678	13	8 42 49.91	2.3498	21 38 31.0	11.178
14	6 47 32.73	2.5255	27 40 24.3	3.853	14	8 45 10.75	2.3447	21 27 16.5	11.306
15	6 50 4.22	2.5242	27 36 27.9	4.028	15	8 47 31.28	2.3396	21 15 54.3	11.433
16	6 52 35.63	2.5227	27 32 21.0	4.202	16	8 49 51.50	2.3344	21 4 24.6	11.558
17	6 55 6.95	2.5211	27 28 3.7	4.376	17	8 52 11.41	2.3293	20 52 47.4	11.682
18	6 57 38.16	2.5193	27 23 35.9	4.549	18	8 54 31.01	2.3241	20 41 2.8	11.804
19	7 0 9.26	2.5173	27 18 57.8	4.722	19	8 56 50.30	2.3189	20 29 10.9	11.924
20	7 2 40.24	2.5153	27 14 9.3	4.894	20	8 59 9.28	2.3138	20 17 11.9	12.043
21	7 5 11.10	2.5132	27 9 10.5	5.066	21	9 1 27.95	2.3086	20 5 5.7	12.162
22	7 7 41.83	2.5109	27 4 1.4	5.237	22	9 3 46.31	2.3034	19 52 52.5	12.278
23	7 10 12.42	2.5085	26 58 42.1	5.408	23	9 6 4.36	2.2983	19 40 32.3	12.393
24	7 12 42.85	2.5059	N.26 53 12.5	5.578	24	9 8 22.10	2.2932	N.19 28 5.3	12.507

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
WEDNESDAY 17.					FRIDAY 19.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	9 8 22.10	2.2932	N. 19 28 5.3	12.507	0	10 53 17.22	2.1012	N. 7 45 24.4	16.199
1	9 10 39.54	2.2881	19 15 31.5	12.619	1	10 55 23.22	2.0988	7 29 11.2	16.240
2	9 12 56.67	2.2830	19 2 51.0	12.729	2	10 57 29.08	2.0967	7 12 55.6	16.279
3	9 15 13.50	2.2780	18 50 4.0	12.837	3	10 59 34.82	2.0946	6 56 37.7	16.317
4	9 17 30.03	2.2729	18 37 10.4	12.944	4	11 1 40.43	2.0925	6 40 17.5	16.354
5	9 19 46.25	2.2678	18 24 10.5	13.052	5	11 3 45.92	2.0905	6 23 55.2	16.388
6	9 22 2.17	2.2628	18 11 4.2	13.157	6	11 5 51.29	2.0887	6 7 30.9	16.422
7	9 24 17.79	2.2579	17 57 51.7	13.260	7	11 7 56.56	2.0869	5 51 4.6	16.455
8	9 26 33.12	2.2531	17 44 33.0	13.362	8	11 10 1.72	2.0853	5 34 36.4	16.486
9	9 28 48.16	2.2482	17 31 8.3	13.462	9	11 12 6.79	2.0837	5 18 6.3	16.515
10	9 31 2.90	2.2433	17 17 37.6	13.561	10	11 14 11.76	2.0821	5 1 34.5	16.543
11	9 33 17.35	2.2384	17 4 1.0	13.658	11	11 16 16.64	2.0807	4 45 1.1	16.569
12	9 35 31.51	2.2337	16 50 18.7	13.753	12	11 18 21.44	2.0793	4 28 26.2	16.594
13	9 37 45.39	2.2289	16 36 30.7	13.847	13	11 20 26.16	2.0781	4 11 49.8	16.618
14	9 39 58.98	2.2242	16 22 37.0	13.940	14	11 22 30.81	2.0769	3 55 12.0	16.640
15	9 42 12.29	2.2196	16 8 37.9	14.030	15	11 24 35.39	2.0758	3 38 33.0	16.661
16	9 44 25.33	2.2150	15 54 33.4	14.120	16	11 26 39.91	2.0749	3 21 52.7	16.681
17	9 46 38.09	2.2104	15 40 23.5	14.208	17	11 28 44.38	2.0741	3 5 11.3	16.698
18	9 48 50.58	2.2059	15 26 8.4	14.294	18	11 30 48.80	2.0733	2 48 28.9	16.715
19	9 51 2.80	2.2015	15 11 48.2	14.379	19	11 32 53.17	2.0725	2 31 45.5	16.730
20	9 53 14.76	2.1971	14 57 22.9	14.463	20	11 34 57.50	2.0719	2 15 1.3	16.743
21	9 55 26.45	2.1927	14 42 52.6	14.545	21	11 37 1.80	2.0714	1 58 16.3	16.756
22	9 57 37.88	2.1884	14 28 17.5	14.625	22	11 39 6.07	2.0710	1 41 30.6	16.767
23	9 59 49.06	2.1842	N. 14 13 37.6	14.705	23	11 41 10.32	2.0707	N. 1 24 44.3	16.777
THURSDAY 18.					SATURDAY 20.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	10 1 59.98	2.1800	N. 13 58 53.0	14.783	0	11 43 14.56	2.0705	N. 1 7 57.4	16.785
1	10 4 10.66	2.1759	13 44 3.7	14.858	1	11 45 18.78	2.0703	0 51 10.1	16.791
2	10 6 21.09	2.1718	13 29 9.9	14.933	2	11 47 23.00	2.0703	0 34 22.5	16.796
3	10 8 31.28	2.1679	13 14 11.7	15.006	3	11 49 27.22	2.0704	0 17 34.6	16.800
4	10 10 41.24	2.1640	12 59 9.2	15.078	4	11 51 31.45	2.0705	N. 0 0 46.5	16.802
5	10 12 50.96	2.1601	12 44 2.4	15.148	5	11 53 35.68	2.0707	S. 0 16 1.7	16.803
6	10 15 0.45	2.1563	12 28 51.5	15.216	6	11 55 39.93	2.0711	0 32 49.9	16.803
7	10 17 9.72	2.1527	12 13 36.5	15.283	7	11 57 44.21	2.0715	0 49 38.1	16.802
8	10 19 18.77	2.1490	11 58 17.5	15.348	8	11 59 48.51	2.0720	1 6 26.1	16.798
9	10 21 27.60	2.1455	11 42 54.7	15.413	9	12 1 52.85	2.0727	1 23 13.8	16.793
10	10 23 36.23	2.1421	11 27 28.0	15.476	10	12 3 57.23	2.0733	1 40 1.2	16.787
11	10 25 44.65	2.1385	11 11 57.6	15.537	11	12 6 1.65	2.0742	1 56 48.3	16.780
12	10 27 52.85	2.1351	10 56 23.6	15.597	12	12 8 6.13	2.0751	2 13 34.8	16.770
13	10 30 0.86	2.1319	10 40 46.0	15.655	13	12 10 10.66	2.0760	2 30 20.7	16.760
14	10 32 8.68	2.1287	10 25 5.0	15.711	14	12 12 15.25	2.0771	2 47 6.0	16.758
15	10 34 16.31	2.1256	10 9 20.6	15.767	15	12 14 19.91	2.0783	3 3 50.5	16.755
16	10 36 23.75	2.1225	9 53 33.0	15.821	16	12 16 24.65	2.0796	3 20 34.2	16.750
17	10 38 31.01	2.1196	9 37 42.2	15.873	17	12 18 29.46	2.0809	3 37 16.9	16.703
18	10 40 38.10	2.1167	9 21 48.3	15.924	18	12 20 34.36	2.0824	3 53 58.6	16.686
19	10 42 45.02	2.1139	9 5 51.3	15.974	19	12 22 39.35	2.0839	4 10 39.2	16.667
20	10 44 51.77	2.1112	8 49 51.4	16.022	20	12 24 44.43	2.0855	4 27 18.7	16.647
21	10 46 58.36	2.1086	8 33 48.7	16.068	21	12 26 49.61	2.0873	4 43 56.8	16.624
22	10 49 4.80	2.1060	8 17 43.2	16.113	22	12 28 54.90	2.0891	5 0 33.6	16.602
23	10 51 11.08	2.1035	8 1 35.1	16.157	23	12 31 0.30	2.0910	5 17 9.0	16.577
24	10 53 17.22	2.1012	N. 7 45 24.4	16.199	24	12 33 5.82	2.0930	S. 5 33 42.8	16.550

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
SUNDAY 21.					TUESDAY 23.				
	<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>		<div>h m s</div>	<div>s</div>	<div>° ' "</div>	<div>"</div>
0	12 33 5.82	2.0930	S. 5 33 42.8	16.550	0	14 17 26.39	2.2818	S. 17 49 1.9	13.489
1	12 35 11.46	2.0951	5 50 15.0	16.522	1	14 19 43.46	2.2872	18 2 28.2	13.387
2	12 37 17.23	2.0973	6 6 45.4	16.493	2	14 22 0.86	2.2927	18 15 48.3	13.283
3	12 39 23.14	2.0996	6 23 14.1	16.462	3	14 24 18.59	2.2982	18 29 2.1	13.177
4	12 41 29.18	2.1019	6 39 40.9	16.430	4	14 26 36.64	2.3037	18 42 9.5	13.069
5	12 43 35.37	2.1044	6 56 5.7	16.396	5	14 28 55.03	2.3092	18 55 10.4	12.960
6	12 45 41.71	2.1069	7 12 28.4	16.360	6	14 31 13.75	2.3147	19 8 4.7	12.850
7	12 47 48.20	2.1095	7 28 48.9	16.323	7	14 33 32.80	2.3203	19 20 52.4	12.737
8	12 49 54.85	2.1123	7 45 7.2	16.286	8	14 35 52.19	2.3259	19 33 33.2	12.623
9	12 52 1.67	2.1150	8 1 23.2	16.247	9	14 38 11.91	2.3314	19 46 7.2	12.508
10	12 54 8.65	2.1178	8 17 36.8	16.205	10	14 40 31.96	2.3370	19 58 34.2	12.391
11	12 56 15.81	2.1209	8 33 47.8	16.162	11	14 42 52.35	2.3427	20 10 54.1	12.272
12	12 58 23.16	2.1240	8 49 56.3	16.118	12	14 45 13.08	2.3483	20 23 6.9	12.152
13	13 0 30.69	2.1271	9 6 2.0	16.073	13	14 47 34.15	2.3539	20 35 12.4	12.030
14	13 2 38.41	2.1303	9 22 5.0	16.026	14	14 49 55.55	2.3595	20 47 10.5	11.907
15	13 4 46.32	2.1336	9 38 5.1	15.977	15	14 52 17.29	2.3652	20 59 1.2	11.782
16	13 6 54.44	2.1370	9 54 2.2	15.926	16	14 54 39.37	2.3708	21 10 44.3	11.655
17	13 9 2.76	2.1404	10 9 56.2	15.874	17	14 57 1.78	2.3763	21 22 19.8	11.527
18	13 11 11.29	2.1440	10 25 47.1	15.821	18	14 59 24.53	2.3819	21 33 47.6	11.397
19	13 13 20.04	2.1476	10 41 34.7	15.766	19	15 1 47.61	2.3875	21 45 7.5	11.266
20	13 15 29.00	2.1513	10 57 19.0	15.710	20	15 4 11.03	2.3931	21 56 19.5	11.133
21	13 17 38.19	2.1551	11 12 59.9	15.652	21	15 6 34.78	2.3987	22 7 23.5	11.000
22	13 19 47.61	2.1590	11 28 37.2	15.592	22	15 8 58.87	2.4042	22 18 19.4	10.864
23	13 21 57.27	2.1629	S. 11 44 10.9	15.532	23	15 11 23.28	2.4097	S. 22 29 7.2	10.727
MONDAY 22.					WEDNESDAY 24.				
0	13 24 7.16	2.1669	S. 11 59 41.0	15.469	0	15 13 48.03	2.4152	S. 22 39 46.7	10.588
1	13 26 17.30	2.1710	12 15 7.2	15.404	1	15 16 13.10	2.4206	22 50 17.8	10.448
2	13 28 27.68	2.1751	12 30 29.5	15.338	2	15 18 38.50	2.4260	23 0 40.4	10.306
3	13 30 38.31	2.1793	12 45 47.8	15.272	3	15 21 4.22	2.4313	23 10 54.5	10.163
4	13 32 49.20	2.1837	13 1 2.0	15.203	4	15 23 30.26	2.4366	23 20 59.9	10.018
5	13 35 0.35	2.1881	13 16 12.1	15.132	5	15 25 56.61	2.4418	23 30 56.7	9.872
6	13 37 11.77	2.1925	13 31 17.9	15.060	6	15 28 23.28	2.4472	23 40 44.6	9.725
7	13 39 23.45	2.1969	13 46 19.3	14.987	7	15 30 50.27	2.4523	23 50 23.7	9.577
8	13 41 35.40	2.2014	14 1 16.3	14.912	8	15 33 17.56	2.4574	23 59 53.8	9.427
9	13 43 47.62	2.2061	14 16 8.7	14.834	9	15 35 45.16	2.4624	24 9 14.9	9.275
10	13 46 0.13	2.2108	14 30 56.4	14.756	10	15 38 13.05	2.4674	24 18 26.8	9.122
11	13 48 12.92	2.2155	14 45 39.4	14.677	11	15 40 41.25	2.4724	24 27 29.5	8.968
12	13 50 25.99	2.2203	15 0 17.6	14.595	12	15 43 9.74	2.4773	24 36 23.0	8.813
13	13 52 39.35	2.2252	15 14 50.8	14.511	13	15 45 38.52	2.4821	24 45 7.1	8.657
14	13 54 53.01	2.2302	15 29 18.9	14.426	14	15 48 7.59	2.4868	24 53 41.8	8.498
15	13 57 6.97	2.2351	15 43 41.9	14.340	15	15 50 36.94	2.4914	25 2 6.9	8.339
16	13 59 21.22	2.2401	15 57 59.7	14.252	16	15 53 6.56	2.4959	25 10 22.5	8.179
17	14 1 35.78	2.2452	16 12 12.1	14.162	17	15 55 36.45	2.5004	25 18 28.4	8.017
18	14 3 50.64	2.2503	16 26 19.1	14.071	18	15 58 6.61	2.5048	25 26 24.5	7.854
19	14 6 5.81	2.2555	16 40 20.6	13.978	19	16 0 37.03	2.5091	25 34 10.9	7.691
20	14 8 21.30	2.2607	16 54 16.5	13.884	20	16 3 7.70	2.5132	25 41 47.4	7.526
21	14 10 37.10	2.2659	17 8 6.7	13.788	21	16 5 38.62	2.5173	25 49 14.0	7.361
22	14 12 53.21	2.2712	17 21 51.1	13.690	22	16 8 9.78	2.5213	25 56 30.7	7.194
23	14 15 9.64	2.2765	17 35 29.5	13.591	23	16 10 41.18	2.5252	26 3 37.3	7.025
24	14 17 26.39	2.2818	S. 17 49 1.9	13.489	24	16 13 12.81	2.5290	S. 26 10 33.7	6.856

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
THURSDAY 25.					SATURDAY 27.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	16 13 12.81	2.5290	S. 26 10 33.7	6.856	0	18 16 20.00	2.5414	S. 28 14 2.1	1.758
1	16 15 44.66	2.5387	26 17 20.0	6.686	1	18 18 52.38	2.5378	28 12 11.3	1.933
2	16 18 16.73	2.5363	26 23 56.0	6.515	2	18 21 24.54	2.5342	28 10 10.1	2.107
3	16 20 49.01	2.5397	26 30 21.8	6.344	3	18 23 56.48	2.5303	28 7 58.5	2.281
4	16 23 21.49	2.5429	26 36 37.3	6.172	4	18 26 28.17	2.5262	28 5 36.5	2.453
5	16 25 54.16	2.5462	26 42 42.4	5.998	5	18 28 59.62	2.5221	28 3 4.1	2.624
6	16 28 27.03	2.5492	26 48 37.0	5.823	6	18 31 30.82	2.5178	28 0 21.5	2.795
7	16 31 0.07	2.5521	26 54 21.1	5.648	7	18 34 1.76	2.5134	27 57 28.7	2.964
8	16 33 33.28	2.5549	26 59 54.7	5.472	8	18 36 32.43	2.5088	27 54 25.8	3.133
9	16 36 6.66	2.5577	27 5 17.7	5.295	9	18 39 2.82	2.5042	27 51 12.8	3.301
10	16 38 40.20	2.5602	27 10 30.1	5.118	10	18 41 32.93	2.4993	27 47 49.7	3.468
11	16 41 13.88	2.5625	27 15 31.9	4.941	11	18 44 2.74	2.4944	27 44 16.7	3.633
12	16 43 47.70	2.5648	27 20 23.0	4.762	12	18 46 32.26	2.4894	27 40 33.8	3.797
13	16 46 21.65	2.5669	27 25 3.3	4.585	13	18 49 1.47	2.4842	27 36 41.0	3.961
14	16 48 55.73	2.5689	27 29 32.9	4.403	14	18 51 30.36	2.4788	27 32 38.5	4.123
15	16 51 29.92	2.5707	27 33 51.6	4.222	15	18 53 58.93	2.4735	27 28 26.3	4.284
16	16 54 4.22	2.5724	27 37 59.5	4.042	16	18 56 27.18	2.4680	27 24 4.5	4.443
17	16 56 38.61	2.5739	27 41 56.6	3.861	17	18 58 55.09	2.4623	27 19 33.1	4.602
18	16 59 13.09	2.5752	27 45 42.8	3.679	18	19 1 22.66	2.4567	27 14 52.2	4.760
19	17 1 47.64	2.5764	27 49 18.1	3.497	19	19 3 49.89	2.4508	27 10 1.9	4.916
20	17 4 22.26	2.5775	27 52 42.5	3.315	20	19 6 16.76	2.4449	27 5 2.3	5.071
21	17 6 56.94	2.5785	27 55 55.9	3.133	21	19 8 43.28	2.4390	26 59 53.4	5.225
22	17 9 31.68	2.5792	27 58 58.4	2.950	22	19 11 9.44	2.4328	26 54 35.3	5.377
23	17 12 6.45	2.5798	S. 28 1 49.9	2.767	23	19 13 35.22	2.4266	S. 26 49 8.1	5.528
FRIDAY 26.					SUNDAY 28.				
	h m s	s	° ' "	"		h m s	s	° ' "	"
0	17 14 41.25	2.5802	S. 28 4 30.5	2.584	0	19 16 0.63	2.4203	S. 26 43 31.9	5.678
1	17 17 16.07	2.5804	28 7 0.0	2.401	1	19 18 25.66	2.4140	26 37 46.7	5.827
2	17 19 50.90	2.5805	28 9 18.6	2.218	2	19 20 50.31	2.4076	26 31 52.7	5.973
3	17 22 25.73	2.5804	28 11 26.1	2.034	3	19 23 14.57	2.4011	26 25 49.9	6.119
4	17 25 0.55	2.5802	28 13 22.7	1.852	4	19 25 38.44	2.3946	26 19 38.4	6.263
5	17 27 35.35	2.5798	28 15 8.3	1.668	5	19 28 1.92	2.3879	26 13 18.3	6.406
6	17 30 10.13	2.5792	28 16 42.9	1.485	6	19 30 24.99	2.3812	26 6 49.7	6.547
7	17 32 44.86	2.5785	28 18 6.5	1.302	7	19 32 47.66	2.3744	26 0 12.6	6.688
8	17 35 19.55	2.5777	28 19 19.1	1.118	8	19 35 9.92	2.3676	25 53 27.1	6.827
9	17 37 54.18	2.5766	28 20 20.7	0.936	9	19 37 31.77	2.3607	25 46 33.4	6.963
10	17 40 28.74	2.5754	28 21 11.4	0.753	10	19 39 53.20	2.3537	25 39 31.5	7.099
11	17 43 3.23	2.5741	28 21 51.1	0.571	11	19 42 14.21	2.3467	25 32 21.5	7.234
12	17 45 37.63	2.5725	28 22 19.9	0.389	12	19 44 34.81	2.3397	25 25 3.4	7.367
13	17 48 11.93	2.5707	28 22 37.8	0.207	13	19 46 54.98	2.3326	25 17 37.4	7.498
14	17 50 46.12	2.5688	28 22 44.8	-0.026	14	19 49 14.72	2.3255	25 10 3.6	7.628
15	17 53 20.19	2.5668	28 22 40.9	+0.155	15	19 51 34.04	2.3184	25 2 22.0	7.757
16	17 55 54.13	2.5646	28 22 26.2	0.336	16	19 53 52.93	2.3112	24 54 32.8	7.883
17	17 58 27.94	2.5623	28 22 0.6	0.516	17	19 56 11.39	2.3040	24 46 36.0	8.009
18	18 1 1.61	2.5598	28 21 24.3	0.694	18	19 58 29.41	2.2967	24 38 31.7	8.133
19	18 3 35.12	2.5571	28 20 37.3	0.873	19	20 0 46.99	2.2894	24 30 20.0	8.256
20	18 6 8.46	2.5543	28 19 39.5	1.052	20	20 3 4.14	2.2822	24 22 1.0	8.377
21	18 8 41.63	2.5513	28 18 31.1	1.229	21	20 5 20.85	2.2748	24 13 34.8	8.496
22	18 11 14.61	2.5482	28 17 12.0	1.407	22	20 7 37.12	2.2675	24 5 1.5	8.614
23	18 13 47.41	2.5449	28 15 42.3	1.583	23	20 9 52.95	2.2602	23 56 21.1	8.731
24	18 16 20.00	2.5414	S. 28 14 2.1	1.758	24	20 12 8.34	2.2528	S. 23 47 33.8	8.846

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.	Hour.	Right Ascension.	Diff. for 1 Min.	Declination.	Diff. for 1 Min.
MONDAY 29.					WEDNESDAY 31.			
h m s	s	° ' "	"		h m s	s	° ' "	"
20 12 8.34	2.2528	S. 23 47 33.8	8.846	0	21 52 10.21	1.9308	S. 14 57 44.1	12.716
20 14 23.29	2.2455	23 38 39.6	8.959	1	21 54 5.90	1.9254	14 44 59.6	12.766
20 16 37.80	2.2382	23 29 38.7	9.071	2	21 56 1.26	1.9200	14 32 12.2	12.814
20 18 51.87	2.2308	23 20 31.1	9.182	3	21 57 56.30	1.9148	14 19 21.9	12.862
20 21 5.50	2.2234	23 11 16.9	9.291	4	21 59 51.03	1.9096	14 6 28.7	12.909
20 23 18.68	2.2161	23 1 56.2	9.398	5	22 1 45.45	1.9044	13 53 32.8	12.954
20 25 31.43	2.2088	22 52 29.1	9.504	6	22 3 39.56	1.8993	13 40 34.2	12.998
20 27 43.73	2.2014	22 42 55.7	9.608	7	22 5 33.37	1.8944	13 27 32.9	13.042
20 29 55.60	2.1941	22 33 16.1	9.712	8	22 7 26.89	1.8895	13 14 29.1	13.085
20 32 7.02	2.1867	22 23 30.3	9.814	9	22 9 20.11	1.8846	13 1 22.8	13.126
20 34 18.00	2.1794	22 13 38.4	9.914	10	22 11 13.04	1.8798	12 48 14.0	13.167
20 36 28.55	2.1722	22 3 40.6	10.013	11	22 13 5.69	1.8751	12 35 2.8	13.207
20 38 38.66	2.1648	21 53 36.8	10.111	12	22 14 58.05	1.8704	12 21 49.2	13.245
20 40 48.33	2.1576	21 43 27.3	10.208	13	22 16 50.14	1.8659	12 8 33.4	13.282
20 42 57.57	2.1504	21 33 12.1	10.301	14	22 18 41.96	1.8614	11 55 15.3	13.319
20 45 6.38	2.1433	21 22 51.2	10.393	15	22 20 33.51	1.8570	11 41 55.1	13.355
20 47 14.76	2.1361	21 12 24.9	10.484	16	22 22 24.80	1.8527	11 28 32.7	13.390
20 49 22.71	2.1289	21 1 53.1	10.575	17	22 24 15.83	1.8484	11 15 8.3	13.423
20 51 30.23	2.1218	20 51 15.9	10.664	18	22 26 6.61	1.8442	11 1 41.9	13.457
20 53 37.33	2.1147	20 40 33.4	10.752	19	22 27 57.14	1.8401	10 48 13.5	13.488
20 55 44.00	2.1077	20 29 45.7	10.838	20	22 29 47.42	1.8361	10 34 43.3	13.519
20 57 50.25	2.1007	20 18 52.9	10.922	21	22 31 37.47	1.8322	10 21 11.2	13.549
20 59 56.08	2.0938	20 7 55.1	11.005	22	22 33 27.28	1.8283	10 7 37.4	13.578
21 2 1.50	2.0868	S. 19 56 52.3	11.087	23	22 35 16.86	1.8245	S. 9 54 1.8	13.607
TUESDAY 30.				THURSDAY, JAN. 1, 1914.				
21 4 6.50	2.0799	S. 19 45 44.7	11.167	0	22 37 6.22	1.8208	S. 9 40 24.6	13.634
21 6 11.09	2.0731	19 34 32.3	11.247					
21 8 15.27	2.0663	19 23 15.1	11.324					
21 10 19.05	2.0596	19 11 53.4	11.400					
21 12 22.42	2.0528	19 0 27.1	11.476					
21 14 25.39	2.0462	18 48 56.3	11.549					
21 16 27.97	2.0397	18 37 21.2	11.621					
21 18 30.15	2.0331	18 25 41.8	11.693					
21 20 31.94	2.0266	18 13 58.1	11.763					
21 22 33.34	2.0202	18 2 10.3	11.831					
21 24 34.36	2.0138	17 50 18.4	11.898					
21 26 34.99	2.0074	17 38 22.5	11.965					
21 28 35.25	2.0012	17 26 22.6	12.030					
21 30 35.13	1.9949	17 14 18.9	12.093					
21 32 34.64	1.9888	17 2 11.4	12.156					
21 34 33.79	1.9827	16 50 0.2	12.217					
21 36 32.57	1.9767	16 37 45.4	12.277					
21 38 30.99	1.9708	16 25 27.0	12.336					
21 40 29.06	1.9649	16 13 5.1	12.393					
21 42 26.78	1.9591	16 0 39.8	12.450					
21 44 24.15	1.9533	15 48 11.1	12.506					
21 46 21.17	1.9475	15 35 39.1	12.560					
21 48 17.85	1.9419	15 23 3.9	12.613					
21 50 14.20	1.9363	15 10 25.5	12.665					
21 52 10.21	1.9308	S. 14 57 44.1	12.716					

MERCURY, 1913.
GREENWICH MEAN TIME.

NOTE.—The sign + indicates north declinations, the sign - indicates south declinations.

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GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			h m	h m s	s	° ' "		"	h m
1	0 57 27.42	+11.628	+ 2 58 1.8	+ 70.96	22 22.9	1	4 32 0.29	+23.277	+22 29 27.7	+73.91	. . .
2	1 2 10.53	11.964	3 27 4.1	74.20	22 23.8	2	4 41 21.31	23.465	22 57 53.2	68.14	0 0.0
3	1 7 1.64	12.295	3 57 22.5	77.30	22 24.9	3	4 50 46.13	23.594	23 23 55.4	61.99	0 5.5
4	1 12 0.65	12.623	4 28 53.5	80.26	22 26.1	4	5 0 13.32	23.661	23 47 26.0	55.52	0 11.0
5	1 17 7.52	12.950	5 1 34.0	83.08	22 27.4	5	5 9 41.38	23.666	24 8 18.3	48.81	0 16.5
6	1 22 22.25	+13.278	+ 5 35 20.6	+ 85.77	22 28.8	6	5 19 8.80	+23.609	+24 26 27.5	+41.93	0 22.1
7	1 27 44.85	13.607	6 10 9.9	88.32	22 30.3	7	5 28 34.11	23.491	24 41 50.3	34.96	0 27.6
8	1 33 15.37	13.938	6 45 58.2	90.73	22 32.0	8	5 37 55.87	23.315	24 54 25.5	27.97	0 33.0
9	1 38 53.91	14.274	7 22 43.8	92.99	22 33.8	9	5 47 12.73	23.083	25 4 13.3	21.03	0 38.4
10	1 44 40.59	14.616	8 0 21.5	95.12	22 35.8	10	5 56 23.45	22.802	25 11 15.7	14.20	0 43.6
11	1 50 35.56	+14.965	+ 8 38 48.5	+ 97.10	22 37.9	11	6 5 26.90	+22.478	+25 15 36.0	+ 7.53	0 48.7
12	1 56 38.98	15.322	9 18 1.0	98.91	22 40.2	12	6 14 22.08	22.115	25 17 18.5	+ 1.06	0 53.7
13	2 2 51.06	15.687	9 57 54.9	100.55	22 42.6	13	6 23 8.12	21.717	25 16 28.7	- 5.16	0 58.5
14	2 9 12.02	16.061	10 38 26.2	102.02	22 45.1	14	6 31 44.28	21.291	25 13 12.7	11.12	1 3.2
15	2 15 42.09	16.446	11 19 30.6	103.31	22 47.8	15	6 40 9.91	20.841	25 7 37.3	16.78	1 7.7
16	2 22 21.54	+16.842	+12 1 3.3	+104.38	22 50.7	16	6 48 24.50	+20.372	+24 59 49.7	-22.14	1 12.0
17	2 29 10.63	17.250	12 42 59.0	105.23	22 53.8	17	6 56 27.62	19.886	24 49 57.3	27.18	1 16.1
18	2 36 9.61	17.668	13 25 12.1	105.83	22 57.0	18	7 4 18.93	19.287	24 38 7.6	31.91	1 20.0
19	2 43 18.74	18.096	14 7 36.6	106.16	23 0.3	19	7 11 58.15	18.879	24 24 28.2	36.32	1 23.8
20	2 50 38.26	18.533	14 50 5.5	106.20	23 3.9	20	7 19 25.09	18.364	24 9 6.6	40.42	1 27.3
21	2 58 8.37	+18.978	+15 32 31.5	+105.92	23 7.7	21	7 26 39.58	+17.843	+23 52 10.5	-44.20	1 30.6
22	3 5 49.23	19.429	16 14 46.5	105.28	23 11.6	22	7 33 41.52	17.318	23 33 47.1	47.69	1 33.6
23	3 13 40.95	19.882	16 56 41.8	104.26	23 15.7	23	7 40 30.82	16.790	23 14 3.6	50.88	1 36.5
24	3 21 43.56	20.335	17 38 7.7	102.83	23 20.0	24	7 47 7.42	16.260	22 53 7.2	53.78	1 39.2
25	3 29 56.98	20.783	18 18 53.8	100.95	23 24.5	25	7 53 31.28	15.728	22 31 4.6	56.40	1 41.6
26	3 38 21.02	+21.220	+18 58 49.3	+ 98.60	23 29.1	26	7 59 42.35	+15.194	+22 8 2.6	-58.74	1 43.8
27	3 46 55.39	21.641	19 37 42.5	95.75	23 34.0	27	8 5 40.61	14.660	21 44 7.7	60.80	1 45.8
28	3 55 39.62	22.040	20 15 21.4	92.40	23 38.9	28	8 11 26.01	14.123	21 19 26.4	62.60	1 47.6
29	4 4 33.08	22.410	20 51 33.6	88.53	23 44.0	29	8 16 58.51	13.584	20 54 4.8	64.15	1 49.2
30	4 13 35.00	22.744	21 26 6.7	84.15	23 49.2	30	8 22 18.06	13.044	20 28 9.1	65.45	1 50.6
31	4 22 44.44	+23.035	+21 58 48.6	+ 79.27	23 54.6	31	8 27 24.59	+12.500	+20 1 45.4	-66.49	1 51.8
32	4 32 0.29	+23.277	+22 29 27.7	+ 73.91	. . .	32	8 32 18.00	+11.951	+19 34 59.6	-67.29	1 52.7
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th. 25th. 30th.					
Semidiameter						Semidiameter					
Horizontal Par.						Horizontal Parallax					
3.54 3.27 3.03 2.83 2.68 2.58 2.53						2.55 2.63 2.78 2.98 3.22 3.50					
9.34 8.61 7.99 7.47 7.07 6.79 6.66						6.71 6.94 7.33 7.85 8.48 9.23					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	8 27 24.59	+12.500	+20 1 45.4	-66.49	1 51.8	1	8 58 59.67	- 7.301	+11 59 46.1	+27.30	0 20.9
2	8 32 18.00	11.951	19 34 59.6	67.29	1 52.7	2	8 56 2.46	7.446	12 11 39.3	32.06	0 14.1
3	8 36 58.18	11.897	19 7 57.6	67.84	1 53.4	3	8 53 3.27	7.464	12 25 21.4	36.36	0 7.2
4	8 41 24.99	10.837	18 40 45.4	68.14	1 53.9	4	8 50 5.25	7.350	12 40 40.7	40.14	{ 0 0.3 23 58.5
5	8 45 38.28	10.869	18 13 29.0	68.19	1 54.2	5	8 47 11.66	7.097	12 57 23.4	43.32	23 46.8
6	8 49 37.84	+ 9.693	+17 46 14.1	-68.00	1 54.2	6	8 44 25.81	- 6.704	+13 15 14.7	+45.85	23 40.3
7	8 53 23.45	9.107	17 19 6.8	67.56	1 54.0	7	8 41 50.98	6.177	13 33 58.5	47.69	23 34.1
8	8 56 54.88	8.510	16 52 13.0	66.87	1 53.5	8	8 39 30.34	5.522	13 53 18.2	48.84	23 28.1
9	9 0 11.83	7.901	16 25 39.0	65.92	1 52.8	9	8 37 26.89	4.746	14 12 57.1	49.28	23 22.4
10	9 3 14.00	7.278	15 59 31.0	64.70	1 51.9	10	8 35 43.40	3.861	14 32 38.1	49.02	23 17.1
11	9 6 1.06	+ 6.641	+15 33 55.5	-63.21	1 50.7	11	8 34 22.34	- 2.879	+14 52 4.5	+48.07	23 12.2
12	9 8 32.65	5.988	15 8 59.0	61.45	1 49.3	12	8 33 25.86	1.814	15 11 0.2	46.46	23 7.8
13	9 10 48.37	5.319	14 44 48.0	59.41	1 47.6	13	8 32 55.78	- 0.682	15 29 9.5	44.21	23 3.8
14	9 12 47.85	4.634	14 21 29.5	57.08	1 45.6	14	8 32 53.57	+ 0.505	15 46 17.5	41.26	23 0.3
15	9 14 30.69	3.930	13 59 10.5	54.45	1 43.4	15	8 33 20.34	1.731	16 2 10.0	37.93	22 57.3
16	9 15 56.46	+ 3.213	+13 37 58.1	-51.53	1 40.9	16	8 34 16.88	+ 2.983	+16 16 33.5	+33.95	22 54.8
17	9 17 4.77	2.477	13 17 59.7	48.30	1 38.1	17	8 35 43.63	4.247	16 29 15.2	29.45	22 52.8
18	9 17 55.26	1.727	12 59 22.6	44.75	1 35.0	18	8 37 40.74	5.511	16 40 3.0	24.45	22 51.3
19	9 18 27.59	0.964	12 42 14.3	40.89	1 31.6	19	8 40 8.06	6.763	16 48 45.3	18.99	22 50.3
20	9 18 41.46	+ 0.191	12 26 42.1	36.74	1 27.8	20	8 43 5.15	7.991	16 55 11.4	13.11	22 49.8
21	9 18 36.69	- 0.589	+12 12 53.4	-32.28	1 23.7	21	8 46 31.33	+ 9.184	+16 59 11.4	+ 6.83	22 49.7
22	9 18 13.18	1.370	12 0 55.3	27.52	1 19.4	22	8 50 25.64	10.333	17 0 36.2	+ 0.19	22 50.1
23	9 17 30.95	2.147	11 50 54.4	22.50	1 14.8	23	8 54 46.89	11.428	16 59 17.7	- 6.77	22 50.9
24	9 16 30.21	2.912	11 42 56.9	17.94	1 9.9	24	8 59 33.69	12.460	16 55 9.1	13.98	22 52.1
25	9 15 11.35	3.656	11 37 8.2	11.78	1 4.6	25	9 4 44.40	13.420	16 48 5.1	21.28	22 53.7
26	9 13 34.99	- 4.368	+11 33 32.7	- 6.16	0 59.0	26	9 10 17.22	+14.301	+16 38 1.7	-28.91	22 55.6
27	9 11 42.01	5.038	11 32 13.7	- 0.42	0 53.2	27	9 16 10.18	15.097	16 24 56.9	36.49	22 57.8
28	9 9 33.59	5.653	11 33 13.0	+ 5.36	0 47.2	28	9 22 21.19	15.804	16 8 50.7	44.02	23 0.3
29	9 7 11.19	6.201	11 36 30.6	11.10	0 40.9	29	9 28 48.06	16.419	15 49 44.9	51.44	23 3.1
30	9 4 36.60	6.667	11 42 4.8	16.73	0 34.4	30	9 35 28.58	16.942	15 27 43.2	58.66	23 6.0
31	9 1 51.95	- 7.037	+11 49 51.9	+22.16	0 27.7	31	9 42 20.53	+17.372	+15 2 51.4	-65.61	23 9.1
32	8 58 59.67	- 7.301	+11 59 46.1	+27.30	0 20.9	32	9 49 21.73	+17.714	+14 35 16.9	-72.21	23 12.3

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
	"	"	"	"	"	"		"	"	"	"	"	"
Semidiameter . . .	3.83	4.20	4.61	5.03	5.40	5.62	Semidiameter . . .	5.57	5.20	4.63	4.02	3.46	3.04
Horizontal Parallax .	10.10	11.08	12.15	13.26	14.24	14.81	Horizontal Parallax	14.67	13.71	12.20	10.56	9.12	8.01

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

MERCURY, 1913.
GREENWICH MEAN TIME.

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509

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

MERCURY, 1913.151

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	15 56 36.98	+10.943	-23 17 58.0	-35.22	1 16.0	1	15 24 12.04	- 1.960	-16 0 29.6	+20.12	22 41.1
2	16 0 54.12	10.475	23 31 16.6	31.30	1 16.3	2	15 23 46.39	- 0.194	15 54 44.4	+ 8.79	22 37.4
3	16 4 59.26	9.942	23 42 59.1	27.20	1 16.4	3	15 24 1.92	+ 1.467	15 53 21.4	- 1.71	22 34.3
4	16 8 50.71	9.333	23 53 0.9	22.90	1 16.3	4	15 24 55.87	3.007	15 55 58.7	11.22	22 31.8
5	16 12 26.57	8.641	24 1 16.9	18.38	1 16.0	5	15 26 25.20	4.415	16 2 11.4	19.65	22 29.9
6	16 15 44.73	+ 7.856	-24 7 41.4	-13.62	1 15.3	6	15 28 26.74	+ 5.691	-16 11 33.4	-27.01	22 28.4
7	16 18 42.86	6.970	24 12 8.4	8.59	1 14.3	7	15 30 57.37	6.840	16 23 39.0	33.29	22 27.4
8	16 21 18.42	5.974	24 14 31.0	- 3.25	1 13.0	8	15 33 54.13	7.870	16 38 3.3	38.57	22 26.8
9	16 23 28.67	4.860	24 14 41.5	+ 2.43	1 11.2	9	15 37 14.27	8.790	16 54 23.0	42.92	22 26.5
10	16 25 10.69	3.621	24 12 31.4	8.47	1 8.9	10	15 40 55.26	9.610	17 12 16.9	46.43	22 26.5
11	16 26 21.47	+ 2.256	-24 7 51.5	+14.92	1 6.1	11	15 44 54.84	+10.341	-17 31 25.6	-49.17	22 26.8
12	16 26 58.00	+ 0.767	24 0 31.8	21.79	1 2.8	12	15 49 11.00	10.993	17 51 31.6	51.22	22 27.4
13	16 26 57.38	- 0.837	23 50 22.1	29.10	0 58.8	13	15 53 41.93	11.574	18 12 19.3	52.64	22 28.2
14	16 26 17.05	2.539	23 37 11.8	36.83	0 54.2	14	15 58 26.05	12.093	18 33 35.1	53.53	22 29.2
15	16 24 54.99	4.308	23 20 51.3	44.93	0 48.9	15	16 3 21.98	12.559	18 55 6.7	53.97	22 30.3
16	16 22 50.08	- 6.101	-23 1 13.1	+53.28	0 42.8	16	16 8 28.50	+12.977	-19 16 43.2	-53.99	22 31.6
17	16 20 2.42	7.859	22 38 13.3	61.69	0 36.1	17	16 13 44.57	13.355	19 38 15.4	53.63	22 33.1
18	16 16 33.70	9.510	22 11 53.9	69.87	0 28.7	18	16 19 9.26	13.697	19 59 34.7	52.93	22 34.7
19	16 12 27.43	10.973	21 42 24.9	77.42	0 20.7	19	16 24 41.76	14.007	20 20 33.8	51.94	22 36.4
20	16 7 49.14	12.164	21 10 6.8	83.87	0 12.2	20	16 30 21.37	14.290	20 41 6.1	50.70	22 38.2
21	16 2 46.37	-13.002	-20 35 32.1	+88.71	{ 0 3.2 23 54.0	21	16 36 7.47	+14.549	-21 1 5.8	-49.23	22 40.2
22	15 57 28.37	13.425	19 59 25.7	91.44	23 44.8	22	16 41 59.52	14.786	21 20 27.7	47.56	22 42.2
23	15 52 5.56	13.399	19 22 43.0	91.68	23 35.6	23	16 47 57.04	15.005	21 39 7.3	45.71	22 44.3
24	15 46 48.82	12.922	18 46 26.8	89.21	23 26.7	24	16 53 59.62	15.207	21 57 0.5	43.70	22 46.4
25	15 41 48.66	12.025	18 11 42.1	84.06	23 18.2	25	17 0 6.88	15.395	22 14 3.6	41.54	22 48.7
26	15 37 14.49	-10.768	-17 39 30.9	+76.49	23 10.3	26	17 6 18.50	+15.570	-22 30 13.2	-39.25	22 51.0
27	15 33 14.00	9.233	17 10 46.4	66.93	23 3.0	27	17 12 34.17	15.734	22 45 26.4	36.84	22 53.4
28	15 29 52.85	7.505	16 46 9.6	55.94	22 56.4	28	17 18 53.63	15.887	22 59 40.4	34.32	22 55.8
29	15 27 14.65	5.669	16 26 7.9	44.12	22 50.6	29	17 25 16.64	16.030	23 12 52.8	31.70	22 58.3
30	15 25 21.04	3.800	16 10 54.3	32.02	22 45.5	30	17 31 42.99	16.164	23 25 1.2	28.99	23 0.9
31	15 24 12.04	- 1.960	-16 0 29.6	+20.12	22 41.1	31	17 38 12.48	+16.291	-23 36 3.5	-26.19	23 3.5
32	15 23 46.39	- 0.194	-15 54 44.4	+ 8.79	22 37.4	32	17 44 44.91	+16.410	-23 45 57.8	-23.32	23 6.1

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
	"	"	"	"	"	"		"	"	"	"	"	"	"
Semidiameter . . .	3.30	3.67	4.14	4.65	4.93	4.69	Semidiameter .	4.14	3.60	3.20	2.91	2.71	2.57	2.47
Horizontal Parallax .	8.70	9.67	10.92	12.27	12.99	12.35	Horizontal Par.	10.89	9.48	8.43	7.68	7.15	6.78	6.51

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign - indicates that south declinations are increasing.

VENUS, 1913.
GREENWICH MEAN TIME.

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5-58

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.							
Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m		
1	1 30 43.83	+7.580	+13 1 13.9	+63.28	2 55.9	1	2 30 58.96	+0.684	+21 55 53.4	+14.29	1 53.7		
2	1 33 44.52	7.475	13 26 21.6	62.38	2 54.9	2	2 31 10.92	+0.312	22 1 4.3	11.61	1 49.9		
3	1 36 42.62	7.365	13 51 7.4	61.44	2 53.9	3	2 31 13.88	-0.066	22 5 9.9	8.84	1 46.0		
4	1 39 38.03	7.250	14 15 30.4	60.48	2 52.9	4	2 31 7.70	0.449	22 8 7.6	5.96	1 42.0		
5	1 42 30.61	7.130	14 39 29.8	59.48	2 51.8	5	2 30 52.28	0.836	22 9 55.0	+ 2.98	1 37.8		
6	1 45 20.24	+7.004	+15 3 4.9	+58.45	2 50.7	6	2 30 27.55	-1.225	+22 10 29.8	- 0.10	1 33.5		
7	1 48 6.77	6.872	15 26 14.8	57.38	2 49.5	7	2 29 53.50	1.612	22 9 49.4	3.27	1 29.0		
8	1 50 50.04	6.733	15 48 58.6	56.28	2 48.3	8	2 29 10.16	1.999	22 7 51.7	6.54	1 24.3		
9	1 53 29.89	6.587	16 11 15.5	55.14	2 47.0	9	2 28 17.60	2.381	22 4 34.5	9.90	1 19.5		
10	1 56 6.16	6.424	16 33 4.6	53.96	2 45.7	10	2 27 15.95	2.755	21 59 55.9	13.33	1 14.5		
11	1 58 38.68	+6.274	+16 54 25.0	+52.74	2 44.3	11	2 26 5.43	-3.119	+21 53 54.3	-16.82	1 9.4		
12	2 1 7.26	6.106	17 15 15.6	51.48	2 42.8	12	2 24 46.32	3.471	21 46 28.3	20.36	1 4.2		
13	2 3 31.69	5.929	17 35 35.3	50.17	2 41.3	13	2 23 18.96	3.807	21 37 36.9	23.92	0 58.8		
14	2 5 51.76	5.743	17 55 23.2	48.82	2 39.7	14	2 21 43.76	4.123	21 27 19.8	27.49	0 53.3		
15	2 8 7.27	5.542	18 14 38.1	47.42	2 38.0	15	2 20 1.24	4.416	21 15 37.2	31.05	0 47.7		
16	2 10 18.00	+5.344	+18 33 19.0	+45.98	2 36.2	16	2 18 11.99	-4.684	+21 2 29.9	-34.55	0 41.9		
17	2 12 23.71	5.130	18 51 24.5	44.48	2 34.3	17	2 16 16.66	4.922	20 47 59.4	37.97	0 36.1		
18	2 14 24.16	4.906	19 8 53.5	42.93	2 32.4	18	2 14 15.97	5.130	20 32 7.9	41.29	0 30.2		
19	2 16 19.10	4.672	19 25 44.6	41.33	2 30.4	19	2 12 10.72	5.302	20 14 58.4	44.47	0 24.2		
20	2 18 8.29	4.427	19 41 56.6	39.67	2 28.3	20	2 10 1.77	5.437	19 56 35.0	47.46	0 18.1		
21	2 19 51.48	+4.172	+19 57 28.1	+37.95	2 26.1	21	2 7 50.02	-5.535	+19 37 2.4	-50.23	0 12.0		
22	2 21 28.42	3.906	20 12 17.5	36.16	2 23.7	22	2 5 36.40	5.594	19 16 26.0	52.76	{ 0 8.9 22 52.7		
23	2 22 58.85	3.629	20 26 23.3	34.31	2 21.2	23	2 3 21.87	5.612	18 54 52.0	55.02	23 53.5		
24	2 24 22.52	3.342	20 39 44.1	32.40	2 18.7	24	2 1 7.38	5.590	18 32 27.3	56.98	23 47.4		
25	2 25 39.19	3.045	20 52 18.2	30.42	2 16.0	25	1 58 53.89	5.528	18 9 19.3	58.62	23 41.3		
26	2 26 48.60	+2.737	+21 4 3.9	+28.37	2 13.2	26	1 56 42.33	-5.429	+17 45 35.9	-59.93	23 35.2		
27	2 27 50.50	2.419	21 14 59.4	26.23	2 10.3	27	1 54 33.60	5.293	17 21 25.3	60.89	23 29.2		
28	2 28 44.64	2.091	21 25 2.7	24.02	2 7.3	28	1 52 28.55	5.122	16 56 55.8	61.51	23 23.3		
29	2 29 30.78	1.753	21 34 11.9	21.73	2 4.1	29	1 50 27.99	4.920	16 32 15.7	61.78	23 17.5		
30	2 30 8.69	1.405	21 42 24.9	19.35	2 0.8	30	1 48 32.65	4.688	16 7 33.4	61.69	23 11.8		
31	2 30 38.15	+1.049	+21 49 39.5	+16.87	1 57.3	31	1 46 43.22	-4.429	+15 42 57.3	-61.26	23 6.1		
32	2 30 58.96	+0.684	+21 55 53.4	+14.29	1 53.7	32	1 45 0.30	-4.145	+15 18 35.3	-60.52	23 0.5		
Day of the Month.						Day of the Month.							
	2d.	7th.	12th.	17th.	22d.	27th.		1st.	6th.	11th.	16th.	21st.	26th.
	"	"	"	"	"	"		"	"	"	"	"	"
Semidiameter . . .	15.19	16.25	17.45	18.80	20.31	21.98	Semidiameter . . .	23.77	25.62	27.36	28.82	29.74	29.90
Horizontal Parallax	15.64	16.73	17.97	19.36	20.92	22.64	Horizontal Parallax	24.48	26.38	28.18	29.68	30.62	30.79

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	1 46 43.22	-4.429	+15 42 57.3	-61.26	23 6.1	1	1 56 6.64	+5.289	+10 5 38.4	+10.29	21 17.1
2	1 45 0.30	4.145	15 18 35.3	60.52	23 0.5	2	1 58 16.05	5.494	10 10 7.1	12.08	21 15.4
3	1 43 24.44	3.840	14 54 34.9	59.47	22 55.1	3	2 0 30.30	5.692	10 15 17.6	13.78	21 13.8
4	1 41 56.10	3.518	14 31 3.1	58.13	22 49.8	4	2 2 49.21	5.883	10 21 8.0	15.40	21 12.2
5	1 40 35.68	3.181	14 8 6.4	56.54	22 44.7	5	2 5 12.62	6.067	10 27 36.4	16.94	21 10.7
6	1 39 23.48	-2.833	+13 45 51.0	-54.71	22 39.7	6	2 7 40.37	+6.245	+10 34 40.8	+18.40	21 9.3
7	1 38 19.76	2.475	13 24 22.2	52.66	22 34.8	7	2 10 12.31	6.416	10 42 19.2	19.78	21 8.0
8	1 37 24.71	2.110	13 3 44.7	50.44	22 30.1	8	2 12 48.29	6.582	10 50 29.9	21.09	21 6.7
9	1 36 38.47	1.742	12 44 2.4	48.06	22 25.6	9	2 15 28.19	6.742	10 59 11.3	22.33	21 5.4
10	1 36 1.10	1.372	12 25 19.0	45.54	22 21.2	10	2 18 11.87	6.897	11 8 21.5	23.50	21 4.2
11	1 35 32.63	-1.001	+12 7 37.4	-42.92	22 17.0	11	2 20 59.21	+7.048	+11 17 58.9	+24.60	21 3.1
12	1 35 13.05	0.632	11 50 59.8	40.21	22 12.9	12	2 23 50.11	7.194	11 28 1.8	25.63	21 2.1
13	1 35 2.31	-0.265	11 35 28.0	37.43	22 8.9	13	2 26 44.48	7.336	11 38 28.7	26.60	21 1.1
14	1 35 0.33	+0.098	11 21 3.6	34.60	22 5.0	14	2 29 42.21	7.474	11 49 18.0	27.50	21 0.2
15	1 35 7.01	0.456	11 7 47.4	31.75	22 1.3	15	2 32 43.21	7.609	12 0 28.3	28.34	20 59.3
16	1 35 22.22	+0.809	+10 55 39.9	-28.89	21 57.7	16	2 35 47.41	+7.741	+12 11 58.0	+29.12	20 58.5
17	1 35 45.80	1.154	10 44 41.1	26.03	21 54.3	17	2 38 54.73	7.869	12 23 45.7	29.84	20 57.7
18	1 36 17.58	1.492	10 34 50.8	23.18	21 51.0	18	2 42 5.08	7.993	12 35 49.9	30.50	20 57.0
19	1 36 57.37	1.823	10 26 8.6	20.35	21 47.9	19	2 45 18.39	8.115	12 48 9.1	31.10	20 56.3
20	1 37 44.98	2.145	10 18 33.7	17.57	21 44.9	20	2 48 34.60	8.234	13 0 42.0	31.64	20 55.7
21	1 38 40.20	+2.457	+10 12 4.8	-14.85	21 42.0	21	2 51 53.63	+8.350	+13 13 27.2	+32.12	20 55.1
22	1 39 42.82	2.760	10 6 40.5	12.19	21 39.2	22	2 55 15.42	8.464	13 26 23.4	32.55	20 54.6
23	1 40 52.61	3.054	10 2 19.4	9.58	21 36.6	23	2 58 39.92	8.575	13 39 29.2	32.92	20 54.1
24	1 42 9.34	3.339	9 59 0.1	7.04	21 34.1	24	3 2 7.05	8.684	13 52 43.2	33.24	20 53.6
25	1 43 32.80	3.615	9 56 40.7	4.58	21 31.6	25	3 5 36.77	8.791	14 6 4.1	33.50	20 53.2
26	1 45 2.76	+3.881	+ 9 55 19.3	- 2.21	21 29.2	26	3 9 9.01	+8.895	+14 19 30.7	+33.71	20 52.8
27	1 46 38.99	4.137	9 54 54.0	+ 0.08	21 27.0	27	3 12 43.73	8.997	14 33 1.8	33.87	20 52.5
28	1 48 21.26	4.385	9 55 22.9	2.29	21 24.8	28	3 16 20.87	9.097	14 46 36.2	33.98	20 52.2
29	1 50 9.37	4.624	9 56 43.8	4.42	21 22.7	29	3 20 0.39	9.195	15 0 12.5	34.04	20 51.9
30	1 52 3.10	4.854	9 58 54.7	6.46	21 20.7	30	3 23 42.24	9.291	15 13 49.5	34.04	20 51.7
31	1 54 2.26	+5.075	+10 1 53.6	+ 8.42	21 18.9	31	3 27 26.36	+9.385	+15 27 26.1	+34.00	20 51.5
32	1 56 6.64	+5.289	+10 5 38.4	+10.29	21 17.1	32	3 31 12.71	+9.477	+15 41 1.2	+33.92	20 51.4
Day of Month.						Day of the Month.					
1st.						5th.					
6th.						10th.					
11th.						15th.					
16th.						20th.					
21st.						25th.					
26th.						30th.					
31st.											
Semidiameter .						Semidiameter .					
Horizontal Par.						Horizontal Parallax					
29.29 28.02 26.34 24.46 22.59 20.82 19.20						17.74 16.46 15.32 14.31 13.41 12.63					
30.16 28.85 27.12 25.19 23.26 21.44 19.77						18.27 16.95 15.77 14.73 13.81 13.00					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

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The sign + prefixed to the hourly change of declination indicates that north declinations are increasing, the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.									
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.				
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.					
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m				
1	8 8 45.07	+12.225	+19 34 1.9	-28.14	21 29.4	1	10 32 0.31	+11.598	+10 17 19.5	-61.63	21 54.2				
2	8 13 38.34	12.214	19 22 30.1	29.50	21 30.3	2	10 36 38.40	11.577	9 52 31.0	62.39	21 54.9				
3	8 18 31.34	12.201	19 10 25.7	30.86	21 31.3	3	10 41 15.99	11.556	9 27 24.7	63.12	21 55.5				
4	8 23 24.01	12.187	18 57 48.9	32.20	21 32.3	4	10 45 53.10	11.536	9 2 1.2	63.82	21 56.2				
5	8 28 16.33	12.172	18 44 40.1	33.52	21 33.2	5	10 50 29.74	11.517	8 36 21.1	64.50	21 56.9				
6	8 33 8.27	+12.156	+18 30 59.6	-34.84	21 34.1	6	10 55 5.93	+11.499	+ 8 10 25.1	-65.15	21 57.6				
7	8 37 59.82	12.139	18 16 47.6	36.15	21 35.0	7	10 59 41.71	11.482	7 44 13.9	65.77	21 58.2				
8	8 42 50.94	12.121	18 2 4.6	37.44	21 35.9	8	11 4 17.09	11.466	7 17 48.1	66.36	21 58.8				
9	8 47 41.63	12.102	17 46 50.8	38.71	21 36.8	9	11 8 52.10	11.452	6 51 8.4	66.93	21 59.4				
10	8 52 31.84	12.082	17 31 6.6	39.97	21 37.7	10	11 13 26.77	11.438	6 24 15.4	67.48	22 0.0				
11	8 57 21.57	+12.061	+17 14 52.4	-41.21	21 38.6	11	11 18 1.12	+11.425	+ 5 57 9.7	-67.99	22 0.7				
12	9 2 10.80	12.040	16 58 8.7	42.43	21 39.5	12	11 22 35.18	11.414	5 29 52.1	68.47	22 1.3				
13	9 6 59.51	12.018	16 40 55.8	43.63	21 40.3	13	11 27 8.99	11.404	5 2 23.4	68.92	22 1.9				
14	9 11 47.69	11.996	16 23 14.2	44.82	21 41.1	14	11 31 42.58	11.395	4 34 44.0	69.35	22 2.5				
15	9 16 35.32	11.973	16 5 4.3	45.99	21 41.9	15	11 36 15.97	11.388	4 6 54.6	69.75	22 3.2				
16	9 21 22.40	+11.950	+15 46 26.5	-47.14	21 42.7	16	11 40 49.20	+11.382	+ 3 38 56.0	-70.12	22 3.8				
17	9 26 8.93	11.927	15 27 21.4	48.27	21 43.6	17	11 45 22.30	11.377	3 10 49.0	70.46	22 4.4				
18	9 30 54.89	11.903	15 7 49.4	49.38	21 44.4	18	11 49 55.30	11.374	2 42 34.1	70.77	22 5.0				
19	9 35 40.28	11.879	14 47 51.1	50.47	21 45.2	19	11 54 28.24	11.372	2 14 12.1	71.05	22 5.6				
20	9 40 25.09	11.855	14 27 26.9	51.54	21 46.0	20	11 59 1.15	11.371	1 45 43.6	71.31	22 6.2				
21	9 45 9.32	+11.831	+14 6 37.5	-52.58	21 46.8	21	12 3 34.07	+11.372	+ 1 17 9.3	-71.53	22 6.8				
22	9 49 52.98	11.807	13 45 23.3	53.60	21 47.6	22	12 8 7.03	11.375	0 48 30.1	71.72	22 7.4				
23	9 54 36.06	11.783	13 23 44.9	54.59	21 48.4	23	12 12 40.06	11.379	+ 0 19 46.7	71.88	22 8.0				
24	9 59 18.56	11.759	13 1 42.9	55.56	21 49.2	24	12 17 13.20	11.384	- 0 9 0.2	72.02	22 8.6				
25	10 4 0.49	11.735	12 39 17.9	56.51	21 49.9	25	12 21 46.48	11.390	0 37 50.0	72.12	22 9.2				
26	10 8 41.85	+11.711	+12 16 30.4	-57.43	21 50.6	26	12 26 19.94	+11.398	- 1 6 41.8	-72.19	22 9.8				
27	10 13 22.65	11.688	11 53 21.2	58.32	21 51.3	27	12 30 53.60	11.407	1 35 34.9	72.22	22 10.5				
28	10 18 2.88	11.665	11 29 50.9	59.19	21 52.0	28	12 35 27.50	11.418	2 4 28.5	72.22	22 11.2				
29	10 22 42.56	11.642	11 6 0.1	60.03	21 52.8	29	12 40 1.67	11.430	2 33 21.9	72.20	22 11.8				
30	10 27 21.70	11.620	10 41 49.4	60.84	21 53.5	30	12 44 36.15	11.444	3 2 14.2	72.14	22 12.4				
31	10 32 0.31	+11.598	+10 17 19.5	-61.63	21 54.2	31	12 49 10.98	+11.459	- 3 31 4.8	-72.05	22 13.0				
32	10 36 38.40	+11.577	+ 9 52 31.0	-62.39	21 54.9	32	12 53 46.18	+11.475	- 3 59 52.8	-71.93	22 13.7				
Day of the Month.		3d.	8th.	13th.	18th.	23d.	28th.	Day of the Month.		3d.	8th.	13th.	18th.	23d.	28th.
		"	"	"	"	"	"			"	"	"	"	"	"
Semidiameter . . .		7.33	7.13	6.95	6.78	6.62	6.48	Semidiameter . . .		6.34	6.21	6.10	5.99	5.89	5.80
Horizontal Parallax		7.55	7.34	7.15	6.98	6.82	6.67	Horizontal Parallax		6.53	6.40	6.28	6.17	6.07	5.97

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.


The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	17 30 41.05	+8.024	-23 44 4.6	- 7.14	22 47.9	1	19 11 41.78	+8.178	-23 12 8.9	+12.43	22 26.7
2	17 33 53.79	8.038	23 46 49.1	6.55	22 47.1	2	19 14 58.01	8.174	23 7 3.0	13.06	22 26.0
3	17 37 6.86	8.051	23 49 19.0	5.94	22 46.4	3	19 18 14.14	8.169	23 1 42.0	13.69	22 25.4
4	17 40 20.23	8.063	23 51 34.2	5.33	22 45.7	4	19 21 30.15	8.164	22 56 6.0	14.31	22 24.7
5	17 43 33.89	8.075	23 53 34.6	4.71	22 45.0	5	19 24 46.02	8.158	22 50 15.0	14.93	22 24.0
6	17 46 47.83	+8.086	-23 55 20.1	- 4.09	22 44.3	6	19 28 1.75	+8.152	-22 44 9.1	+15.55	22 23.3
7	17 50 2.04	8.097	23 56 50.8	3.47	22 43.6	7	19 31 17.32	8.145	22 37 48.4	16.16	22 22.6
8	17 53 16.49	8.107	23 58 6.6	2.84	22 42.9	8	19 34 32.71	8.138	22 31 13.0	16.77	22 22.0
9	17 56 31.17	8.117	23 59 7.3	2.21	22 42.2	9	19 37 47.91	8.130	22 24 23.0	17.38	22 21.3
10	17 59 46.08	8.126	23 59 52.8	1.58	22 41.5	10	19 41 2.91	8.121	22 17 18.5	17.99	22 20.6
11	18 3 1.19	+8.134	-24 0 23.1	- 0.95	22 40.8	11	19 44 17.70	+8.112	-22 9 59.5	+18.59	22 19.9
12	18 6 16.50	8.141	24 0 38.4	- 0.32	22 40.1	12	19 47 32.27	8.102	22 2 26.1	19.19	22 19.2
13	18 9 31.98	8.148	24 0 38.5	+ 0.31	22 39.5	13	19 50 46.61	8.092	21 54 38.5	19.78	22 18.5
14	18 12 47.62	8.155	24 0 23.3	0.95	22 38.8	14	19 54 0.70	8.082	21 46 36.8	20.37	22 17.8
15	18 16 3.41	8.161	23 59 52.9	1.59	22 38.1	15	19 57 14.54	8.071	21 38 21.0	20.95	22 17.0
16	18 19 19.33	+8.166	-23 59 7.2	+ 2.22	22 37.4	16	20 0 28.12	+8.060	-21 29 51.3	+21.53	22 16.3
17	18 22 35.36	8.171	23 58 6.1	2.86	22 36.7	17	20 3 41.43	8.049	21 21 7.8	22.10	22 15.6
18	18 25 51.50	8.175	23 56 49.7	3.50	22 36.1	18	20 6 54.47	8.038	21 12 10.6	22.67	22 14.8
19	18 29 7.74	8.178	23 55 17.9	4.14	22 35.4	19	20 10 7.23	8.026	21 2 59.8	23.23	22 14.1
20	18 32 24.06	8.181	23 53 30.8	4.78	22 34.7	20	20 13 19.70	8.014	20 53 35.5	23.79	22 13.4
21	18 35 40.45	+8.183	-23 51 28.3	+ 5.42	22 34.1	21	20 16 31.88	+8.002	-20 43 57.7	+24.35	22 12.6
22	18 38 56.89	8.185	23 49 10.5	6.06	22 33.4	22	20 19 43.76	7.989	20 34 6.6	24.90	22 11.9
23	18 42 13.38	8.187	23 46 37.3	6.70	22 32.7	23	20 22 55.34	7.976	20 24 2.4	25.44	22 11.2
24	18 45 29.91	8.189	23 43 48.8	7.34	22 32.1	24	20 26 6.62	7.963	20 13 45.2	25.98	22 10.4
25	18 48 46.46	8.190	23 40 44.9	7.98	22 31.4	25	20 29 17.58	7.950	20 3 15.1	26.52	22 9.6
26	18 52 3.02	+8.190	-23 37 25.7	+ 8.62	22 30.7	26	20 32 28.22	+7.937	-19 52 32.3	+27.05	22 8.8
27	18 55 19.57	8.189	23 33 51.1	9.26	22 30.1	27	20 35 38.53	7.923	19 41 36.9	27.57	22 8.0
28	18 58 36.11	8.188	23 30 1.2	9.90	22 29.4	28	20 38 48.50	7.909	19 30 29.0	28.08	22 7.3
29	19 1 52.62	8.187	23 25 56.0	10.54	22 28.7	29	20 41 58.13	7.895	19 19 8.8	28.59	22 6.5
30	19 5 9.08	8.184	23 21 35.5	11.17	22 28.1	30	20 45 7.42	7.880	19 7 36.4	29.10	22 5.7
31	19 8 25.47	+8.181	-23 16 59.8	+11.80	22 27.4	31	20 48 16.36	+7.865	-18 55 51.9	+29.60	22 4.9
32	19 11 41.78	+8.178	-23 12 8.9	+12.43	22 26.7	32	20 51 24.94	+7.850	-18 43 55.5	+30.09	22 4.1
Day of the Month.						Day of the Month.					
	1st.	6th.	11th.	16th.	21st.		5th.	10th.	15th.	20th.	25th.
	"	"	"	"	"		"	"	"	"	"
Semidiameter .	2.10	2.12	2.14	2.16	2.17	Semidiameter .	2.23	2.25	2.28	2.30	2.32
Horizontal Par. .	3.66	3.69	3.72	3.75	3.78	Horizontal Parallax .	3.89	3.93	3.97	4.01	4.05

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.



The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	23 43 29.46	+7.069	-3 15 41.7	+45.55	21 7.2	1	1 10 12.20	+6.958	+ 6 1 3.9	+43.10	20 31.8
2	23 46 19.05	7.062	2 57 28.2	45.59	21 6.1	2	1 12 59.19	6.958	6 18 16.2	42.92	20 30.6
3	23 49 8.46	7.055	2 39 14.0	45.61	21 5.0	3	1 15 46.17	6.958	6 35 23.8	42.72	20 29.4
4	23 51 57.71	7.048	2 20 59.2	45.62	21 3.9	4	1 18 33.16	6.958	6 52 26.5	42.51	20 28.3
5	23 54 46.79	7.041	2 2 44.1	45.63	21 2.8	5	1 21 20.15	6.958	7 9 24.1	42.29	20 27.1
6	23 57 35.70	+7.035	-1 44 28.9	+45.63	21 1.6	6	1 24 7.14	+6.958	+ 7 26 16.5	+42.07	20 26.0
7	0 0 24.46	7.029	1 26 13.8	45.62	21 0.5	7	1 26 54.14	6.958	7 43 3.5	41.84	20 24.8
8	0 3 13.07	7.023	1 7 59.0	45.61	20 59.4	8	1 29 41.15	6.958	7 59 45.0	41.60	20 23.7
9	0 6 1.53	7.017	0 49 44.7	45.58	20 58.3	9	1 32 28.16	6.959	8 16 20.7	41.36	20 22.5
10	0 8 49.85	7.011	0 31 31.0	45.55	20 57.1	10	1 35 15.19	6.960	8 32 50.6	41.11	20 21.4
11	0 11 38.04	+7.006	-0 13 18.1	+45.52	20 56.0	11	1 38 2.23	+6.961	+ 8 49 14.5	+40.86	20 20.2
12	0 14 26.10	7.001	+0 4 53.7	45.47	20 54.8	12	1 40 49.29	6.962	9 5 32.3	40.61	20 19.1
13	0 17 14.05	6.996	0 23 4.3	45.41	20 53.7	13	1 43 36.39	6.963	9 21 43.9	40.35	20 17.9
14	0 20 1.89	6.991	0 41 13.5	45.35	20 52.5	14	1 46 23.52	6.964	9 37 49.1	40.08	20 16.7
15	0 22 49.62	6.987	0 59 21.2	45.28	20 51.4	15	1 49 10.68	6.966	9 53 47.8	39.81	20 15.6
16	0 25 37.25	+6.983	+1 17 27.2	+45.21	20 50.2	16	1 51 57.88	+6.968	+10 9 39.9	+39.53	20 14.4
17	0 28 24.79	6.979	1 35 31.4	45.13	20 49.1	17	1 54 45.13	6.970	10 25 25.3	39.25	20 13.3
18	0 31 12.26	6.976	1 53 33.6	45.05	20 47.9	18	1 57 32.42	6.972	10 41 3.9	38.96	20 12.1
19	0 33 59.66	6.973	2 11 33.7	44.96	20 46.8	19	2 0 19.76	6.974	10 56 35.5	38.66	20 11.0
20	0 36 47.00	6.971	2 29 31.5	44.86	20 45.6	20	2 3 7.15	6.976	11 11 59.9	38.36	20 9.8
21	0 39 34.28	+6.969	+2 47 26.9	+44.75	20 44.5	21	2 5 54.60	+6.978	+11 27 17.0	+38.06	20 8.6
22	0 42 21.51	6.967	3 5 19.6	44.64	20 43.3	22	2 8 42.11	6.980	11 42 26.7	37.75	20 7.5
23	0 45 8.70	6.965	3 23 9.5	44.52	20 42.2	23	2 11 29.67	6.983	11 57 28.9	37.43	20 6.3
24	0 47 55.85	6.964	3 40 56.4	44.39	20 41.0	24	2 14 17.28	6.985	12 12 23.5	37.11	20 5.2
25	0 50 42.96	6.962	3 58 40.2	44.26	20 39.9	25	2 17 4.94	6.987	12 27 10.3	36.78	20 4.0
26	0 53 30.04	+6.961	+4 16 20.7	+44.12	20 38.7	26	2 19 52.66	+6.989	+12 41 49.2	+36.45	20 2.9
27	0 56 17.10	6.960	4 33 57.7	43.97	20 37.6	27	2 22 40.44	6.991	12 56 20.0	36.11	20 1.8
28	0 59 4.15	6.960	4 51 31.0	43.81	20 36.4	28	2 25 28.26	6.993	13 10 42.6	35.76	20 0.6
29	1 1 51.17	6.959	5 9 0.4	43.64	20 35.2	29	2 28 16.12	6.995	13 24 56.8	35.41	19 59.5
30	1 4 38.19	6.959	5 26 25.8	43.47	20 34.1	30	2 31 4.02	6.997	13 39 2.6	35.06	19 58.3
31	1 7 25.20	+6.959	+5 43 47.0	+43.29	20 32.9	31	2 33 51.96	+6.998	+13 52 59.8	+34.70	19 57.2
32	1 10 12.20	+6.958	+6 1 3.9	+43.10	20 31.8	32	2 36 39.94	+6.999	+14 6 48.3	+34.34	19 56.0
Day of Month.						Day of the Month.					
Semidiameter .						Semidiameter . . .					
Horizontal Par.						Horizontal Parallax					
1st.	2.68	2.71	2.74	2.77	2.80	5th.	2.91	2.94	2.98	3.02	3.06
6th.	4.66	4.72	4.77	4.83	4.88	10th.	5.06	5.13	5.19	5.26	5.33
11th.						15th.					
16th.						20th.					
21st.						25th.					
26th.						30th.					
31st.											

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	2 33 51.96	+6.998	+13 52 59.8	+34.70	19 57.2	1	4 0 33.92	+6.947	+19 46 15.6	+21.82	19 21.7
2	2 36 39.94	6.999	14 6 48.3	34.34	19 56.0	2	4 3 20.55	6.939	19 54 53.9	21.37	19 20.5
3	2 39 27.95	7.000	14 20 28.0	33.97	19 54.9	3	4 6 6.99	6.931	20 3 21.3	20.92	19 19.4
4	2 42 15.97	7.001	14 33 58.8	33.59	19 53.7	4	4 8 53.23	6.922	20 11 37.9	20.47	19 18.2
5	2 45 4.01	7.002	14 47 20.5	33.21	19 52.6	5	4 11 39.27	6.913	20 19 43.7	20.01	19 17.0
6	2 47 52.07	+7.002	+15 0 33.0	+32.83	19 51.4	6	4 14 25.09	+6.904	+20 27 38.6	+19.56	19 15.8
7	2 50 40.14	7.003	15 13 36.3	32.44	19 50.3	7	4 17 10.68	6.894	20 35 22.6	19.11	19 14.6
8	2 53 28.21	7.003	15 26 30.2	32.05	19 49.2	8	4 19 56.02	6.884	20 42 55.7	18.66	19 13.4
9	2 56 16.28	7.003	15 39 14.6	31.65	19 48.0	9	4 22 41.11	6.873	20 50 18.0	18.21	19 12.2
10	2 59 4.35	7.003	15 51 49.5	31.25	19 46.9	10	4 25 25.94	6.862	20 57 29.5	17.76	19 11.0
11	3 1 52.42	+7.003	+16 4 14.8	+30.85	19 45.7	11	4 28 10.50	+6.851	+21 4 30.2	+17.31	19 9.8
12	3 4 40.49	7.002	16 16 30.5	30.45	19 44.6	12	4 30 54.78	6.839	21 11 20.1	16.86	19 8.6
13	3 7 28.55	7.002	16 28 36.5	30.04	19 43.5	13	4 33 38.77	6.827	21 17 59.3	16.41	19 7.4
14	3 10 16.60	7.002	16 40 32.7	29.63	19 42.3	14	4 36 22.46	6.814	21 24 27.8	15.96	19 6.2
15	3 13 4.64	7.001	16 52 19.0	29.22	19 41.2	15	4 39 5.84	6.801	21 30 45.7	15.52	19 5.0
16	3 15 52.67	+7.001	+17 3 55.3	+28.81	19 40.0	16	4 41 48.90	+6.787	+21 36 53.0	+15.08	19 3.8
17	3 18 40.68	7.000	17 15 21.7	28.39	19 38.9	17	4 44 31.62	6.773	21 42 49.7	14.64	19 2.5
18	3 21 28.67	6.999	17 26 38.1	27.97	19 37.8	18	4 47 13.99	6.758	21 48 35.8	14.20	19 1.3
19	3 24 16.63	6.998	17 37 44.3	27.55	19 36.6	19	4 49 56.00	6.742	21 54 11.3	13.76	19 0.0
20	3 27 4.56	6.997	17 48 40.3	27.12	19 35.5	20	4 52 37.63	6.726	21 59 36.3	13.32	18 58.8
21	3 29 52.45	+6.995	+17 59 26.1	+26.69	19 34.3	21	4 55 18.86	+6.709	+22 4 50.9	+12.89	18 57.5
22	3 32 40.29	6.993	18 10 1.6	26.26	19 33.2	22	4 57 59.68	6.692	22 9 55.1	12.46	18 56.2
23	3 35 28.08	6.990	18 20 26.7	25.83	19 32.0	23	5 0 40.08	6.674	22 14 49.0	12.03	18 55.0
24	3 38 15.80	6.987	18 30 41.3	25.39	19 30.9	24	5 3 20.04	6.655	22 19 32.6	11.60	18 53.7
25	3 41 3.44	6.983	18 40 45.4	24.95	19 29.8	25	5 5 59.53	6.635	22 24 6.0	11.18	18 52.4
26	3 43 50.99	+6.979	+18 50 39.0	+24.51	19 28.6	26	5 8 38.53	+6.614	+22 28 29.2	+10.76	18 51.1
27	3 46 38.45	6.975	19 0 21.9	24.07	19 27.5	27	5 11 17.03	6.593	22 32 42.4	10.34	18 49.8
28	3 49 25.81	6.971	19 9 54.1	23.62	19 26.3	28	5 13 55.00	6.571	22 36 45.5	9.92	18 48.5
29	3 52 13.05	6.966	19 19 15.6	23.17	19 25.1	29	5 16 32.43	6.548	22 40 38.7	9.51	18 47.1
30	3 55 0.16	6.960	19 28 26.4	22.72	19 24.0	30	5 19 9.29	6.524	22 44 22.1	9.11	18 45.8
31	3 57 47.12	+6.954	+19 37 26.4	+22.27	19 22.8	31	5 21 45.57	+6.499	+22 47 55.8	+ 8.70	18 44.5
32	4 0 33.92	+6.947	+19 46 15.6	+21.82	19 21.7	32	5 24 21.25	+6.473	+22 51 19.8	+ 8.30	18 43.1
Day of the Month.						Day of the Month.					
5th. 10th. 15th. 20th. 25th. 30th.						4th. 9th. 14th. 19th. 24th. 29th.					
" " " " " "						" " " " " "					
Semidiameter 3.15 3.19 3.24 3.29 3.34 3.40						Semidiameter 3.46 3.52 3.59 3.66 3.74 3.82					
Horizontal Parallax . 5.48 5.56 5.64 5.73 5.82 5.92						Horizontal Parallax . 6.03 6.14 6.26 6.39 6.52 6.66					

MARS, 1913.
GREENWICH MEAN TIME.






NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign - indicates that north declinations are decreasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Me- ian sa
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h
1	17 58 41.59	+2.472	23 13 31.7	-0.29	23 13.7	1	18 28 14.50	+2.251	23 6 33.1	+1.32	21
2	17 59 40.88	2.469	23 13 37.9	0.23	23 10.8	2	18 29 8.40	2.240	23 6 0.9	1.36	21
3	18 0 40.10	2.466	23 13 42.8	0.17	23 7.8	3	18 30 2.03	2.229	23 5 27.7	1.40	21
4	18 1 39.23	2.462	23 13 46.3	0.11	23 4.8	4	18 30 55.37	2.217	23 4 53.5	1.44	21
5	18 2 38.27	2.458	23 13 48.4	-0.06	23 1.9	5	18 31 48.41	2.205	23 4 18.5	1.48	21
6	18 3 37.22	+2.454	23 13 49.1	0.00	22 59.0	6	18 32 41.15	+2.192	23 3 42.6	+1.51	21
7	18 4 36.07	2.450	23 13 48.4	+0.06	22 56.0	7	18 33 33.58	2.179	23 3 5.8	1.55	21
8	18 5 34.80	2.445	23 13 46.3	0.12	22 53.1	8	18 34 25.70	2.165	23 2 28.2	1.58	21
9	18 6 33.41	2.440	23 13 42.8	0.18	22 50.1	9	18 35 17.49	2.151	23 1 49.8	1.62	21
10	18 7 31.91	2.435	23 13 37.8	0.24	22 47.2	10	18 36 8.96	2.137	23 1 10.6	1.65	21
11	18 8 30.28	+2.429	23 13 31.5	+0.29	22 44.2	11	18 37 0.10	+2.123	23 0 30.6	+1.68	21
12	18 9 28.50	2.423	23 13 23.9	0.35	22 41.2	12	18 37 50.89	2.109	22 59 49.9	1.71	21
13	18 10 26.58	2.417	23 13 15.0	0.40	22 38.2	13	18 38 41.33	2.094	22 59 8.5	1.73	21
14	18 11 24.51	2.411	23 13 4.9	0.46	22 35.3	14	18 39 31.41	2.079	22 58 26.4	1.76	21
15	18 12 22.27	2.404	23 12 53.4	0.51	22 32.3	15	18 40 21.13	2.064	22 57 43.7	1.79	20
16	18 13 19.86	+2.397	23 12 40.6	+0.57	22 29.3	16	18 41 10.48	+2.048	22 57 0.3	+1.82	20
17	18 14 17.29	2.390	23 12 26.5	0.62	22 26.3	17	18 41 59.46	2.032	22 56 16.4	1.84	20
18	18 15 14.55	2.383	23 12 11.1	0.67	22 23.4	18	18 42 48.06	2.016	22 55 32.0	1.86	20
19	18 16 11.64	2.375	23 11 54.5	0.72	22 20.4	19	18 43 36.27	2.000	22 54 47.1	1.89	20
20	18 17 8.54	2.367	23 11 36.7	0.77	22 17.4	20	18 44 24.09	1.984	22 54 1.6	1.91	20
21	18 18 5.24	+2.359	23 11 17.6	+0.82	22 14.4	21	18 45 11.51	+1.967	22 53 15.7	+1.93	20
22	18 19 1.75	2.350	23 10 57.3	0.87	22 11.4	22	18 45 58.53	1.950	22 52 29.3	1.95	20
23	18 19 58.05	2.341	23 10 35.9	0.92	22 8.4	23	18 46 45.14	1.933	22 51 42.5	1.96	20
24	18 20 54.13	2.332	23 10 13.3	0.97	22 5.4	24	18 47 31.33	1.915	22 50 55.3	1.98	20
25	18 21 50.00	2.323	23 9 49.6	1.02	22 2.3	25	18 48 17.09	1.897	22 50 7.8	1.99	20
26	18 22 45.65	+2.314	23 9 24.8	+1.06	21 59.3	26	18 49 2.42	+1.879	22 49 20.0	+2.00	20
27	18 23 41.07	2.304	23 8 58.8	1.11	21 56.3	27	18 49 47.32	1.861	22 48 31.8	2.01	20
28	18 24 36.25	2.294	23 8 31.8	1.15	21 53.3	28	18 50 31.77	1.843	22 47 43.4	2.02	20
29	18 25 31.19	2.284	23 8 3.7	1.20	21 50.2	29	18 51 15.76	1.823	22 46 54.8	2.03	20
30	18 26 25.89	2.273	23 7 34.5	1.24	21 47.2	30	18 51 59.30	1.803	22 46 6.0	2.04	20
31	18 27 20.33	+2.262	23 7 4.3	+1.28	21 44.2	31	18 52 42.37	+1.784	22 45 17.1	+2.04	20
32	18 28 14.50	+2.251	23 6 33.1	+1.32	21 41.2	32	18 53 24.96	+1.764	22 44 28.0	+2.05	20
Day of the Month.						Day of the Month.					
2d.						8d.					
10th.						11th.					
18th.						19th.					
26th.						2					
"						"					
"						"					
Semidiameter . .						Semidiameter . .					
Horizontal Parallax						Horizontal Parallax					
15.15 15.23 15.35 15.50						15.69 15.92 16.18 1					
1.42 1.42 1.43 1.45						1.47 1.49 1.51					

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon	Noon.	Noon.	Noon			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	18 51 15.76	+1.823	-22 46 54.8	+2.03	20 13.8	1	19 9 35.32	+1.088	-22 23 9.8	+1.58	18 29.9
2	18 51 59.30	1.803	22 46 6.0	2.04	20 10.6	2	19 10 1.09	1.060	22 22 32.5	1.54	18 26.4
3	18 52 42.37	1.784	22 45 17.1	2.04	20 7.4	3	19 10 26.18	1.031	22 21 56.1	1.50	18 22.9
4	18 53 24.96	1.764	22 44 28.0	2.05	20 4.2	4	19 10 50.58	1.002	22 21 20.7	1.46	18 19.4
5	18 54 7.06	1.744	22 43 38.8	2.05	20 1.0	5	19 11 14.28	0.973	22 20 46.3	1.42	18 15.8
6	18 54 48.66	+1.723	-22 42 49.6	+2.05	19 57.7	6	19 11 37.28	+0.944	-22 20 12.9	+1.37	18 12.3
7	18 55 29.77	1.702	22 42 0.4	2.04	19 54.5	7	19 11 59.57	0.914	22 19 40.5	1.33	18 8.7
8	18 56 10.37	1.681	22 41 11.2	2.04	19 51.2	8	19 12 21.15	0.884	22 19 9.2	1.28	18 5.1
9	18 56 50.45	1.660	22 40 22.1	2.04	19 47.9	9	19 12 42.02	0.854	22 18 39.0	1.24	18 1.5
10	18 57 30.01	1.638	22 39 33.1	2.03	19 44.6	10	19 13 2.16	0.824	22 18 9.9	1.19	17 57.9
11	18 58 9.05	+1.616	-22 38 44.2	+2.03	19 41.3	11	19 13 21.57	+0.794	-22 17 42.0	+1.14	17 54.3
12	18 58 47.55	1.593	22 37 55.5	2.02	19 38.0	12	19 13 40.25	0.764	22 17 15.3	1.09	17 50.7
13	18 59 25.50	1.570	22 37 7.0	2.01	19 34.7	13	19 13 58.20	0.733	22 16 49.8	1.04	17 47.0
14	19 0 2.91	1.547	22 36 18.8	2.00	19 31.4	14	19 14 15.40	0.702	22 16 25.6	0.99	17 43.4
15	19 0 39.77	1.524	22 35 30.8	1.99	19 28.1	15	19 14 31.85	0.671	22 16 2.6	0.94	17 39.7
16	19 1 16.06	+1.500	-22 34 43.1	+1.98	19 24.7	16	19 14 47.54	+0.639	-22 15 40.9	+0.88	17 36.0
17	19 1 51.78	1.476	22 33 55.8	1.96	19 21.4	17	19 15 2.48	0.607	22 15 20.5	0.83	17 32.3
18	19 2 26.93	1.452	22 33 8.9	1.95	19 18.0	18	19 15 16.66	0.575	22 15 1.4	0.77	17 28.6
19	19 3 1.50	1.428	22 32 22.3	1.93	19 14.7	19	19 15 30.08	0.543	22 14 43.6	0.71	17 24.9
20	19 3 35.48	1.404	22 31 36.2	1.91	19 11.3	20	19 15 42.74	0.511	22 14 27.2	0.65	17 21.2
21	19 4 8.87	+1.379	-22 30 50.6	+1.89	19 7.9	21	19 15 54.63	+0.479	-22 14 12.2	+0.59	17 17.4
22	19 4 41.67	1.354	22 30 5.5	1.87	19 4.5	22	19 16 5.74	0.448	22 13 58.6	0.53	17 13.7
23	19 5 13.87	1.329	22 29 21.0	1.85	19 1.1	23	19 16 16.08	0.415	22 13 46.4	0.47	17 9.9
24	19 5 45.45	1.303	22 28 37.1	1.82	18 57.7	24	19 16 25.64	0.382	22 13 35.5	0.42	17 6.1
25	19 6 16.41	1.277	22 27 53.8	1.80	18 54.3	25	19 16 34.40	0.349	22 13 26.1	0.36	17 2.3
26	19 6 46.76	+1.251	-22 27 11.1	+1.77	18 50.8	26	19 16 42.37	+0.316	-22 13 18.2	+0.30	16 58.5
27	19 7 16.48	1.225	22 26 29.0	1.74	18 47.4	27	19 16 49.55	0.283	22 13 11.8	0.24	16 54.7
28	19 7 45.56	1.198	22 25 47.6	1.71	18 43.9	28	19 16 55.93	0.249	22 13 6.8	0.18	16 50.9
29	19 8 13.98	1.171	22 25 7.0	1.68	18 40.4	29	19 17 1.51	0.215	22 13 3.3	0.12	16 47.0
30	19 8 41.75	1.144	22 24 27.1	1.65	18 36.9	30	19 17 6.29	0.182	22 13 1.3	+0.05	16 43.1
31	19 9 8.87	+1.116	-22 23 48.0	+1.62	18 33.4	31	19 17 10.26	+0.148	-22 13 0.9	-0.01	16 39.2
32	19 9 35.32	+1.088	-22 23 9.8	+1.58	18 29.9	32	19 17 13.41	+0.114	-22 13 2.0	-0.08	16 35.3

Day of the Month.	7th.	15th.	23d.	31st.	Day of the Month.	8th.	16th.	24th.
	"	"	"	"		"	"	"
Semidiameter . .	16.81	17.17	17.57	18.00	Semidiameter	18.45	18.92	19.41
Horizontal Parallax	1.57	1.60	1.64	1.68	Horizontal Parallax . .	1.72	1.77	1.81

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; the sign - indicates that south declinations are increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascen- sion.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			h m s	s	° ' "	"	
1	19 17 10.26	+0.148	-22 13 0.9	-0.01	16 39.2	1	19 12 38.66	-0.849	-22 25 4.5	-1.82	14 32.6
2	19 17 13.41	0.114	22 13 2.0	0.03	16 35.3	2	19 12 17.94	0.877	22 25 48.6	1.86	14 28.3
3	19 17 15.75	0.081	22 13 4.8	0.15	16 31.4	3	19 11 56.55	0.905	22 26 33.7	1.90	14 24.0
4	19 17 17.28	0.047	22 13 9.1	0.21	16 27.5	4	19 11 34.51	0.932	22 27 19.8	1.94	14 19.7
5	19 17 18.00	+0.013	22 13 14.9	0.28	16 23.6	5	19 11 11.84	0.958	22 28 6.9	1.98	14 15.4
6	19 17 17.90	-0.021	-22 13 22.2	-0.34	16 19.7	6	19 10 48.55	-0.983	-22 28 54.9	-2.02	14 11.1
7	19 17 16.98	0.055	22 13 31.2	0.41	16 15.7	7	19 10 24.65	1.008	22 29 43.7	2.05	14 6.8
8	19 17 15.26	0.089	22 13 41.7	0.47	16 11.7	8	19 10 0.17	1.032	22 30 33.3	2.08	14 2.4
9	19 17 12.72	0.122	22 13 53.7	0.53	16 7.7	9	19 9 35.11	1.055	22 31 23.6	2.11	13 58.1
10	19 17 9.36	0.156	22 14 7.2	0.60	16 3.7	10	19 9 9.50	1.077	22 32 14.6	2.14	13 53.7
11	19 17 5.20	-0.190	-22 14 22.2	-0.66	15 59.7	11	19 8 43.34	-1.099	-22 33 6.2	-2.17	13 49.4
12	19 17 0.24	0.223	22 14 38.8	0.73	15 55.7	12	19 8 16.66	1.120	22 33 58.5	2.19	13 45.0
13	19 16 54.48	0.257	22 14 56.9	0.79	15 51.7	13	19 7 49.48	1.141	22 34 51.3	2.21	13 40.6
14	19 16 47.92	0.290	22 15 16.5	0.85	15 47.7	14	19 7 21.82	1.161	22 35 44.5	2.23	13 36.2
15	19 16 40.56	0.323	22 15 37.6	0.91	15 43.6	15	19 6 53.69	1.180	22 36 38.2	2.25	13 31.8
16	19 16 32.41	-0.356	-22 16 0.2	-0.97	15 39.5	16	19 6 25.11	-1.199	-22 37 32.4	-2.27	13 27.4
17	19 16 23.48	0.388	22 16 24.2	1.03	15 35.4	17	19 5 56.10	1.217	22 38 26.9	2.28	13 23.0
18	19 16 13.76	0.421	22 16 49.7	1.09	15 31.3	18	19 5 26.67	1.234	22 39 21.8	2.29	13 18.5
19	19 16 3.27	0.453	22 17 16.6	1.15	15 27.2	19	19 4 56.85	1.250	22 40 17.0	2.30	13 14.1
20	19 15 52.01	0.485	22 17 44.8	1.20	15 23.1	20	19 4 26.65	1.265	22 41 12.4	2.30	13 9.7
21	19 15 39.98	-0.517	-22 18 14.4	-1.26	15 18.9	21	19 3 56.10	-1.280	-22 42 7.9	-2.31	13 5.2
22	19 15 27.18	0.549	22 18 45.4	1.32	15 14.8	22	19 3 25.21	1.294	22 43 3.5	2.32	13 0.7
23	19 15 13.62	0.580	22 19 17.8	1.37	15 10.6	23	19 2 54.00	1.307	22 43 59.2	2.33	12 56.3
24	19 14 59.32	0.611	22 19 51.4	1.43	15 6.5	24	19 2 22.50	1.319	22 44 55.0	2.33	12 51.8
25	19 14 44.27	0.642	22 20 26.3	1.48	15 2.3	25	19 1 50.73	1.330	22 45 50.8	2.33	12 47.4
26	19 14 28.48	-0.673	-22 21 2.5	-1.53	14 58.1	26	19 1 18.70	-1.340	-22 46 46.6	-2.32	12 42.9
27	19 14 11.96	0.703	22 21 39.9	1.58	14 53.9	27	19 0 46.43	1.349	22 47 42.3	2.32	12 38.5
28	19 13 54.71	0.733	22 22 18.5	1.63	14 49.7	28	19 0 13.94	1.357	22 48 37.9	2.31	12 34.0
29	19 13 36.75	0.762	22 22 58.3	1.68	14 45.4	29	18 59 41.27	1.364	22 49 33.3	2.30	12 29.5
30	19 13 18.08	0.791	22 23 39.3	1.73	14 41.2	30	18 59 8.44	1.370	22 50 28.4	2.29	12 25.0
31	19 12 58.71	-0.820	-22 24 21.4	-1.77	14 36.9	31	18 58 35.47	-1.375	-22 51 23.3	-2.28	12 20.5
32	19 12 38.66	-0.849	-22 25 4.5	-1.82	14 32.6	32	18 58 2.39	-1.380	-22 52 18.0	-2.27	12 16.0
Day of the Month.						Day of the Month.					
2d.						8d.					
10th.						11th.					
18th.						19th.					
26th.						27th.					
Semidiameter . .						Semidiameter . .					
Horizontal Parallax						Horizontal Parallax					
19.91 20.41 20.88 21.33						21.73 22.06 22.32 22.49					
1.86 1.91 1.95 1.99						2.03 2.06 2.09 2.10					

NOTE.—The sign + indicates north declinations: the sign - indicates south declinations.

GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	18 58 35.47	-1.375	22 51 23.3	-2.28	12 20.5	1	18 42 34.73	-1.061	23 14 54.8	-1.39	10 2.8
2	18 58 2.39	1.380	22 52 18.0	2.27	12 16.0	2	18 42 9.56	1.037	23 15 27.6	1.35	9 58.4
3	18 57 29.22	1.384	22 53 12.3	2.26	12 11.5	3	18 41 44.97	1.012	23 15 59.5	1.32	9 54.1
4	18 56 55.99	1.386	22 54 6.3	2.24	12 7.1	4	18 41 20.97	0.987	23 16 30.6	1.28	9 49.8
5	18 56 22.71	1.387	22 54 59.9	2.22	12 2.7	5	18 40 57.59	0.961	23 17 0.8	1.24	9 45.5
6	18 55 49.42	-1.387	22 55 53.0	-2.20	11 58.2	6	18 40 34.85	-0.934	23 17 30.1	-1.20	9 41.2
7	18 55 16.14	1.386	22 56 45.6	2.18	11 53.7	7	18 40 12.75	0.907	23 17 58.5	1.16	9 36.9
8	18 54 42.89	1.384	22 57 37.7	2.16	11 49.2	8	18 39 51.31	0.879	23 18 26.0	1.12	9 32.6
9	18 54 9.70	1.381	22 58 29.3	2.14	11 44.7	9	18 39 30.55	0.851	23 18 52.6	1.09	9 28.3
10	18 53 36.60	1.377	22 59 20.4	2.12	11 40.2	10	18 39 10.46	0.822	23 19 18.3	1.05	9 24.1
11	18 53 3.62	-1.372	23 0 10.8	-2.09	11 35.8	11	18 38 51.07	-0.793	23 19 43.1	-1.01	9 19.8
12	18 52 30.77	1.366	23 1 0.6	2.06	11 31.3	12	18 38 32.38	0.764	23 20 7.0	0.97	9 15.6
13	18 51 58.06	1.359	23 1 49.9	2.03	11 26.8	13	18 38 14.41	0.734	23 20 30.0	0.93	9 11.4
14	18 51 25.54	1.351	23 2 38.4	2.00	11 22.3	14	18 37 57.17	0.703	23 20 52.2	0.90	9 7.2
15	18 50 53.22	1.342	23 3 26.1	1.97	11 17.8	15	18 37 40.66	0.672	23 21 13.5	0.87	9 3.0
16	18 50 21.12	-1.332	23 4 13.1	-1.94	11 13.3	16	18 37 24.89	-0.641	23 21 34.0	-0.84	8 58.8
17	18 49 49.27	1.322	23 4 59.4	1.91	11 8.9	17	18 37 9.87	0.610	23 21 53.7	0.80	8 54.6
18	18 49 17.68	1.311	23 5 44.9	1.88	11 4.4	18	18 36 55.60	0.579	23 22 12.6	0.77	8 50.4
19	18 48 46.38	1.299	23 6 29.6	1.85	11 0.0	19	18 36 42.10	0.547	23 22 30.7	0.73	8 46.2
20	18 48 15.38	1.286	23 7 13.5	1.82	10 55.5	20	18 36 29.38	0.514	23 22 48.0	0.70	8 42.1
21	18 47 44.71	-1.272	23 7 56.6	-1.79	10 51.1	21	18 36 17.43	-0.481	23 23 4.5	-0.67	8 38.0
22	18 47 14.39	1.256	23 8 38.8	1.75	10 46.7	22	18 36 6.27	0.448	23 23 20.3	0.63	8 33.9
23	18 46 44.43	1.240	23 9 20.2	1.72	10 42.3	23	18 35 55.90	0.415	23 23 35.3	0.60	8 29.8
24	18 46 14.86	1.223	23 10 0.9	1.68	10 37.9	24	18 35 46.33	0.382	23 23 49.5	0.57	8 25.7
25	18 45 45.70	1.206	23 10 40.7	1.64	10 33.5	25	18 35 37.56	0.349	23 24 2.9	0.54	8 21.6
26	18 45 16.98	-1.188	23 11 19.6	-1.60	10 29.1	26	18 35 29.60	-0.315	23 24 15.5	-0.51	8 17.6
27	18 44 48.69	1.169	23 11 57.6	1.56	10 24.7	27	18 35 22.45	0.281	23 24 27.3	0.48	8 13.5
28	18 44 20.88	1.149	23 12 34.7	1.52	10 20.3	28	18 35 16.13	0.247	23 24 38.4	0.45	8 9.5
29	18 43 53.56	1.128	23 13 11.0	1.49	10 15.9	29	18 35 10.63	0.213	23 24 48.7	0.42	8 5.5
30	18 43 26.75	1.106	23 13 46.5	1.45	10 11.5	30	18 35 5.96	0.178	23 24 58.2	0.39	8 1.5
31	18 43 0.47	-1.084	23 14 21.1	-1.42	10 7.2	31	18 35 2.12	-0.143	23 25 7.0	-0.36	7 57.5
32	18 42 34.73	-1.061	23 14 54.8	-1.39	10 2.8	32	18 34 59.11	-0.108	23 25 15.1	-0.33	7 53.5

Day of the Month.	5th.	13th.	21st.	29th.	Day of the Month.	6th.	14th.	22d.	30th.
	"	"	"	"		"	"	"	"
Semidiameter . .	22.55	22.51	22.37	22.15	Semidiameter . .	21.85	21.48	21.06	20.60
Horizontal Parallax	2.11	2.10	2.09	2.07	Horizontal Parallax	2.04	2.01	1.97	1.93

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	18 56 17.17	+1.710	23 6 27.2	+2.14	4 15.0	1	19 20 4.62	+2.210	22 29 42.3	+4.05	2 40.7
2	18 56 58.45	1.731	23 5 35.2	2.19	4 11.8	2	19 20 57.81	2.222	22 28 4.3	4.22	2 37.7
3	18 57 40.25	1.752	23 4 41.8	2.25	4 8.5	3	19 21 51.28	2.234	22 26 24.7	4.19	2 34.6
4	18 58 22.54	1.772	23 3 47.0	2.31	4 5.3	4	19 22 45.03	2.245	22 24 43.4	4.26	2 31.6
5	18 59 5.32	1.792	23 2 50.8	2.37	4 2.1	5	19 23 39.04	2.256	22 23 0.4	4.32	2 28.5
6	18 59 48.58	+1.812	23 1 53.1	+2.43	3 58.9	6	19 24 33.31	+2.267	22 21 15.8	+4.39	2 25.5
7	19 0 32.31	1.832	23 0 54.0	2.49	3 55.7	7	19 25 27.83	2.277	22 19 29.6	4.46	2 22.5
8	19 1 16.50	1.851	22 59 53.5	2.55	3 52.5	8	19 26 22.60	2.287	22 17 41.7	4.53	2 19.5
9	19 2 1.16	1.870	22 58 51.6	2.61	3 49.3	9	19 27 17.61	2.297	22 15 52.2	4.60	2 16.5
10	19 2 46.27	1.889	22 57 48.3	2.67	3 46.1	10	19 28 12.84	2.306	22 14 1.0	4.66	2 13.5
11	19 3 31.82	+1.907	22 56 43.5	+2.73	3 42.9	11	19 29 8.30	+2.315	22 12 8.2	+4.73	2 10.5
12	19 4 17.79	1.925	22 55 37.2	2.79	3 39.8	12	19 30 3.98	2.324	22 10 13.8	4.80	2 7.5
13	19 5 4.19	1.943	22 54 29.4	2.85	3 36.6	13	19 30 59.87	2.333	22 8 17.7	4.87	2 4.5
14	19 5 51.02	1.960	22 53 20.2	2.92	3 33.5	14	19 31 55.96	2.341	22 6 19.9	4.94	2 1.5
15	19 6 38.26	1.977	22 52 9.4	2.98	3 30.3	15	19 32 52.25	2.349	22 4 20.5	5.01	1 58.5
16	19 7 25.90	+1.994	22 50 57.1	+3.04	3 27.2	16	19 33 48.74	+2.357	22 2 19.4	+5.08	1 55.5
17	19 8 13.94	2.010	22 49 43.3	3.10	3 24.0	17	19 34 45.42	2.365	22 0 16.7	5.14	1 52.5
18	19 9 2.38	2.026	22 48 27.9	3.17	3 20.9	18	19 35 42.27	2.372	21 58 12.3	5.21	1 49.5
19	19 9 51.20	2.042	22 47 10.9	3.24	3 17.8	19	19 36 39.29	2.379	21 56 6.3	5.28	1 46.5
20	19 10 40.39	2.057	22 45 52.3	3.31	3 14.7	20	19 37 36.49	2.386	21 53 58.8	5.35	1 43.5
21	19 11 29.96	+2.072	22 44 32.2	+3.37	3 11.6	21	19 38 33.86	+2.393	21 51 49.5	+5.42	1 40.5
22	19 12 19.90	2.087	22 43 10.5	3.44	3 8.5	22	19 39 31.38	2.400	21 49 38.6	5.49	1 37.6
23	19 13 10.20	2.102	22 41 47.2	3.50	3 5.4	23	19 40 29.05	2.406	21 47 26.1	5.56	1 34.6
24	19 14 0.85	2.117	22 40 22.3	3.57	3 2.3	24	19 41 26.87	2.412	21 45 12.0	5.62	1 31.6
25	19 14 51.84	2.131	22 38 55.8	3.64	2 59.2	25	19 42 24.82	2.417	21 42 56.2	5.69	1 28.6
26	19 15 43.17	+2.145	22 37 27.7	+3.71	2 56.1	26	19 43 22.90	+2.422	21 40 38.8	+5.76	1 25.7
27	19 16 34.83	2.159	22 35 57.9	3.78	2 53.0	27	19 44 21.10	2.427	21 38 19.8	5.82	1 22.7
28	19 17 26.81	2.172	22 34 26.5	3.85	2 49.9	28	19 45 19.42	2.432	21 35 59.3	5.89	1 19.7
29	19 18 19.10	2.185	22 32 53.4	3.91	2 46.8	29	19 46 17.86	2.436	21 33 37.2	5.95	1 16.8
30	19 19 11.71	2.198	22 31 18.7	3.98	2 43.8	30	19 47 16.39	2.440	21 31 13.5	6.01	1 13.8
31	19 20 4.62	+2.210	22 29 42.3	+4.05	2 40.7	31	19 48 15.01	+2.443	21 28 48.2	+6.08	1 10.9
32	19 20 57.81	+2.222	22 28 4.3	+4.12	2 37.7	32	19 49 13.71	+2.447	21 26 21.4	+6.15	1 7.9

Day of the Month.	2d.	10th.	18th.	26th.	Day of the Month.	4th.	12th.	20th.	28th.	26th.
	"	"	"	"		"	"	"	"	"
Semidiameter . .	17.08	16.76	16.47	16.22	Semidiameter . .	16.00	15.81	15.67	15.55	15.47
Horizontal Parallax	1.59	1.56	1.54	1.52	Horizontal Parallax	1.49	1.48	1.47	1.46	1.45

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	3 44 18.80	-0.506	+17 38 15.0	-1.04	9 0.6	1	3 41 27.01	+0.062	+17 37 22.3	+0.93	6 56.0
2	3 44 6.84	0.490	17 37 50.9	0.98	8 56.5	2	3 41 28.71	0.081	17 37 45.4	1.00	6 52.1
3	3 43 55.27	0.474	17 37 28.1	0.92	8 52.4	3	3 41 30.88	0.100	17 38 10.0	1.06	6 48.2
4	3 43 44.10	0.457	17 37 6.7	0.86	8 48.3	4	3 41 33.52	0.120	17 38 36.2	1.12	6 44.3
5	3 43 33.32	0.440	17 36 46.7	0.80	8 44.2	5	3 41 36.62	0.139	17 39 3.9	1.19	6 40.4
6	3 43 22.94	-0.423	+17 36 28.2	-0.74	8 40.1	6	3 41 40.19	+0.158	+17 39 33.1	+1.25	6 36.5
7	3 43 12.97	0.406	17 36 11.1	0.68	8 36.0	7	3 41 44.22	0.178	17 40 3.8	1.31	6 32.7
8	3 43 3.42	0.389	17 35 55.5	0.62	8 31.9	8	3 41 48.71	0.197	17 40 36.0	1.37	6 28.8
9	3 42 54.29	0.371	17 35 41.4	0.56	8 27.8	9	3 41 53.66	0.216	17 41 9.7	1.43	6 25.0
10	3 42 45.59	0.353	17 35 28.7	0.50	8 23.7	10	3 41 59.07	0.235	17 41 44.9	1.50	6 21.1
11	3 42 37.31	-0.335	+17 35 17.6	-0.44	8 19.6	11	3 42 4.94	+0.254	+17 42 21.7	+1.56	6 17.3
12	3 42 29.47	0.317	17 35 8.0	0.37	8 15.6	12	3 42 11.26	0.273	17 42 59.9	1.62	6 13.4
13	3 42 22.06	0.299	17 34 59.9	0.31	8 11.5	13	3 42 18.03	0.292	17 43 39.5	1.68	6 9.6
14	3 42 15.08	0.281	17 34 53.4	0.24	8 7.5	14	3 42 25.26	0.311	17 44 20.5	1.74	6 5.8
15	3 42 8.55	0.263	17 34 48.5	0.18	8 3.4	15	3 42 32.94	0.329	17 45 2.9	1.80	6 2.0
16	3 42 2.47	-0.245	+17 34 45.1	-0.11	7 59.4	16	3 42 41.06	+0.348	+17 45 46.6	+1.85	5 58.2
17	3 41 56.84	0.226	17 34 43.2	-0.05	7 55.4	17	3 42 49.62	0.366	17 46 31.7	1.91	5 54.4
18	3 41 51.65	0.207	17 34 42.8	+0.02	7 51.4	18	3 42 58.62	0.384	17 47 18.1	1.96	5 50.6
19	3 41 46.91	0.188	17 34 44.0	0.08	7 47.4	19	3 43 8.05	0.402	17 48 5.9	2.02	5 46.9
20	3 41 42.63	0.169	17 34 46.8	0.15	7 43.4	20	3 43 17.92	0.420	17 48 55.0	2.07	5 43.1
21	3 41 38.81	-0.150	+17 34 51.2	+0.21	7 39.4	21	3 43 28.21	+0.438	+17 49 45.4	+2.13	5 39.4
22	3 41 35.44	0.131	17 34 57.1	0.27	7 35.4	22	3 43 38.93	0.456	17 50 37.0	2.18	5 35.6
23	3 41 32.52	0.112	17 35 4.5	0.34	7 31.4	23	3 43 50.08	0.473	17 51 29.9	2.23	5 31.9
24	3 41 30.06	0.093	17 35 13.5	0.41	7 27.4	24	3 44 1.65	0.491	17 52 24.1	2.28	5 28.1
25	3 41 28.06	0.074	17 35 24.1	0.47	7 23.4	25	3 44 13.64	0.509	17 53 19.5	2.33	5 24.4
26	3 41 26.53	-0.055	+17 35 36.3	+0.54	7 19.5	26	3 44 26.05	+0.526	+17 54 16.1	+2.38	5 20.7
27	3 41 25.45	0.036	17 35 50.1	0.60	7 15.6	27	3 44 38.87	0.543	17 55 13.9	2.43	5 17.0
28	3 41 24.83	-0.017	17 36 5.4	0.67	7 11.6	28	3 44 52.10	0.560	17 56 12.9	2.48	5 13.3
29	3 41 24.68	+0.003	17 36 22.3	0.74	7 7.7	29	3 45 5.74	0.577	17 57 13.0	2.53	5 9.6
30	3 41 24.99	0.022	17 36 40.7	0.80	7 3.8	30	3 45 19.78	0.594	17 58 14.3	2.57	5 5.9
31	3 41 25.77	+0.042	+17 37 0.7	+0.87	6 59.9	31	3 45 34.23	+0.611	+17 59 16.7	+2.62	5 2.2
32	3 41 27.01	+0.062	+17 37 22.3	+0.93	6 56.0	32	3 45 49.08	+0.627	+18 0 20.2	+2.67	4 58.5
Day of the Month.						Day of the Month.					
2d.						2d.					
10th.						11th.					
18th.						19th.					
26th.						27th.					
"						"					
Semidiameter . .						Semidiameter . .					
Horizontal Parallax						Horizontal Parallax					
9.29						8.81					
9.18						8.68					
9.06						8.55					
8.94						8.43					
1.06						1.00					
1.04						0.98					
1.03						0.97					
1.01						0.96					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	4 9 6.14	+1.276	+19 20 20.9	+3.73	1 33.6	1	4 25 39.07	+1.363	+20 4 6.9	+3.25	23 44.8
2	4 9 36.84	1.282	19 21 50.3	3.73	1 30.2	2	4 26 11.79	1.363	20 5 24.4	3.22	23 41.4
3	4 10 7.68	1.287	19 23 19.6	3.72	1 26.8	3	4 26 44.51	1.363	20 6 41.3	3.19	23 38.0
4	4 10 38.64	1.292	19 24 48.7	3.71	1 23.4	4	4 27 17.22	1.362	20 7 57.7	3.17	23 34.6
5	4 11 9.72	1.297	19 26 17.6	3.70	1 20.0	5	4 27 49.91	1.362	20 9 13.5	3.14	23 31.2
6	4 11 40.92	+1.302	+19 27 46.2	+3.69	1 16.6	6	4 28 22.58	+1.361	+20 10 28.7	+3.12	23 27.9
7	4 12 12.25	1.307	19 29 14.6	3.68	1 13.1	7	4 28 55.23	1.360	20 11 43.2	3.10	23 24.5
8	4 12 43.68	1.312	19 30 42.8	3.67	1 9.7	8	4 29 27.84	1.358	20 12 57.1	3.07	23 21.1
9	4 13 15.21	1.316	19 32 10.7	3.66	1 6.3	9	4 30 0.41	1.357	20 14 10.4	3.05	23 17.7
10	4 13 46.84	1.320	19 33 38.3	3.65	1 2.9	10	4 30 32.94	1.355	20 15 23.0	3.02	23 14.3
11	4 14 18.57	+1.324	+19 35 5.6	+3.64	0 59.5	11	4 31 5.44	+1.353	+20 16 35.0	+2.99	23 10.9
12	4 14 50.39	1.328	19 36 32.6	3.62	0 56.1	12	4 31 37.89	1.351	20 17 46.3	2.96	23 7.5
13	4 15 22.30	1.331	19 37 59.3	3.61	0 52.7	13	4 32 10.28	1.348	20 18 56.9	2.93	23 4.1
14	4 15 54.29	1.334	19 39 25.6	3.59	0 49.3	14	4 32 42.61	1.346	20 20 6.9	2.90	23 0.7
15	4 16 26.36	1.337	19 40 51.6	3.58	0 45.9	15	4 33 14.88	1.343	20 21 16.3	2.87	22 57.3
16	4 16 58.49	+1.340	+19 42 17.2	+3.56	0 42.5	16	4 33 47.09	+1.340	+20 22 25.0	+2.84	22 53.9
17	4 17 30.69	1.343	19 43 42.4	3.55	0 39.1	17	4 34 19.22	1.337	20 23 32.9	2.81	22 50.5
18	4 18 2.96	1.346	19 45 7.2	3.53	0 35.7	18	4 34 51.28	1.334	20 24 40.2	2.78	22 47.1
19	4 18 35.29	1.349	19 46 31.6	3.51	0 32.3	19	4 35 23.27	1.331	20 25 46.8	2.75	22 43.7
20	4 19 7.67	1.351	19 47 55.6	3.49	0 28.9	20	4 35 55.18	1.328	20 26 52.7	2.73	22 40.3
21	4 19 40.10	+1.353	+19 49 19.2	+3.47	0 25.5	21	4 36 26.99	+1.324	+20 27 57.9	+2.71	22 36.9
22	4 20 12.58	1.355	19 50 42.3	3.45	0 22.1	22	4 36 58.71	1.320	20 29 2.4	2.67	22 33.5
23	4 20 45.11	1.357	19 52 5.0	3.43	0 18.7	23	4 37 30.34	1.316	20 30 6.1	2.64	22 30.1
24	4 21 17.67	1.358	19 53 27.2	3.41	0 15.4	24	4 38 1.87	1.312	20 31 9.1	2.61	22 26.7
25	4 21 50.26	1.359	19 54 48.9	3.39	0 12.0	25	4 38 33.30	1.307	20 32 11.4	2.58	22 23.3
26	4 22 22.89	+1.360	+19 56 10.2	+3.37	0 8.6	26	4 39 4.62	+1.303	+20 33 13.0	+2.55	22 19.9
27	4 22 55.55	1.361	19 57 31.0	3.35	0 5.2	27	4 39 35.83	1.298	20 34 13.9	2.52	22 16.5
28	4 23 28.23	1.362	19 58 51.2	3.33	0 1.8 23 52.4	28	4 40 6.92	1.293	20 35 14.1	2.49	22 13.1
29	4 24 0.92	1.362	20 0 10.9	3.31	23 55.0	29	4 40 37.88	1.288	20 36 13.5	2.46	22 9.7
30	4 24 33.63	1.363	20 1 30.1	3.29	23 51.6	30	4 41 8.72	1.282	20 37 12.1	2.43	22 6.2
31	4 25 6.35	+1.363	+20 2 48.8	+3.27	23 48.2	31	4 41 39.44	+1.277	+20 38 9.9	+2.40	22 2.8
32	4 25 39.07	+1.363	+20 4 6.9	+3.25	23 44.8	32	4 42 10.02	+1.271	+20 39 6.9	+2.36	21 59.4
Day of the Month.						Day of the Month.					
2d.						2d.					
10th.						11th.					
18th.						19th.					
26th.						27th.					
Semidiameter . .						Semidiameter . .					
Horizontal Parallax						Horizontal Parallax					
7.76						7.70					
7.73						7.71					
7.71						7.73					
7.70						7.77					
0.88						0.87					
0.88						0.88					
0.88						0.88					
0.87						0.88					

NOTE.—The sign + indicates north declinations; the sign — indicates south declinations.

GREENWICH MEAN TIME.

GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Merid- ian Pas- sage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Day of Month.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			h m s	s	° ' "	"	
1	5 551.69	+0.555	+21 13 2.4	+0.46	18 22.9	1	5 9 12.95	-0.010	+21 14 1.2	-0.28	1
2	5 6 4.81	0.538	21 13 13.2	0.43	18 19.1	2	5 9 12.48	0.029	21 13 54.2	0.31	1
3	5 6 17.52	0.520	21 13 23.3	0.41	18 15.4	3	5 9 11.53	0.049	21 13 46.7	0.33	1
4	5 6 29.80	0.503	21 13 32.8	0.38	18 11.7	4	5 9 10.11	0.069	21 13 38.7	0.35	1
5	5 6 41.66	0.485	21 13 41.7	0.35	18 8.0	5	5 9 8.22	0.089	21 13 30.2	0.37	1
6	5 6 53.09	+0.467	+21 13 50.0	+0.33	18 4.2	6	5 9 5.85	-0.109	+21 13 21.1	-0.39	1
7	5 7 4.09	0.449	21 13 57.7	0.30	18 0.5	7	5 9 3.01	0.128	21 13 11.5	0.41	1
8	5 7 14.66	0.431	21 14 4.7	0.28	17 56.7	8	5 8 59.71	0.147	21 13 1.5	0.43	1
9	5 7 24.79	0.413	21 14 11.1	0.25	17 52.9	9	5 8 55.94	0.167	21 12 51.0	0.45	1
10	5 7 34.48	0.395	21 14 16.9	0.23	17 49.1	10	5 8 51.70	0.186	21 12 39.9	0.47	1
11	5 7 43.73	+0.376	+21 14 22.0	+0.20	17 45.3	11	5 8 47.00	-0.205	+21 12 28.3	-0.49	1
12	5 7 52.54	0.358	21 14 26.5	0.18	17 41.5	12	5 8 41.84	0.224	21 12 16.3	0.51	1
13	5 8 0.91	0.339	21 14 30.4	0.15	17 37.7	13	5 8 36.22	0.243	21 12 3.8	0.53	1
14	5 8 8.83	0.321	21 14 33.7	0.13	17 33.9	14	5 8 30.14	0.262	21 11 50.8	0.55	1
15	5 8 16.30	0.302	21 14 36.5	0.10	17 30.1	15	5 8 23.61	0.281	21 11 37.3	0.57	1
16	5 8 23.31	+0.283	+21 14 38.6	+0.08	17 26.3	16	5 8 16.63	-0.300	+21 11 23.3	-0.59	1
17	5 8 29.87	0.264	21 14 40.1	0.06	17 22.5	17	5 8 9.20	0.319	21 11 8.8	0.61	1
18	5 8 35.98	0.244	21 14 41.0	+0.03	17 18.6	18	5 8 1.32	0.338	21 10 53.8	0.63	1
19	5 8 41.63	0.225	21 14 41.4	0.00	17 14.8	19	5 7 53.00	0.356	21 10 38.4	0.65	1
20	5 8 46.82	0.206	21 14 41.2	-0.02	17 10.9	20	5 7 44.24	0.374	21 10 22.5	0.67	1
21	5 8 51.55	+0.187	+21 14 40.4	-0.05	17 7.1	21	5 7 35.05	-0.392	+21 10 6.2	-0.69	1
22	5 8 55.81	0.168	21 14 39.0	0.08	17 3.2	22	5 7 25.42	0.410	21 9 49.4	0.71	1
23	5 8 59.61	0.148	21 14 37.1	0.10	16 59.4	23	5 7 15.36	0.428	21 9 32.2	0.73	1
24	5 9 2.94	0.129	21 14 34.6	0.12	16 55.5	24	5 7 4.88	0.446	21 9 14.5	0.75	1
25	5 9 5.79	0.109	21 14 31.5	0.14	16 51.6	25	5 6 53.97	0.463	21 8 56.4	0.76	1
26	5 9 8.17	+0.089	+21 14 27.8	-0.16	16 47.7	26	5 6 42.65	-0.480	+21 8 37.8	-0.78	1
27	5 9 10.08	0.070	21 14 23.6	0.18	16 43.8	27	5 6 30.92	0.497	21 8 18.8	0.80	1
28	5 9 11.51	0.050	21 14 18.8	0.21	16 39.9	28	5 6 18.79	0.514	21 7 59.4	0.82	1
29	5 9 12.46	0.030	21 14 13.5	0.23	16 36.0	29	5 6 6.25	0.531	21 7 39.5	0.84	1
30	5 9 12.94	+0.010	21 14 7.6	0.26	16 32.0	30	5 5 53.32	0.547	21 7 19.2	0.85	1
31	5 9 12.95	-0.010	+21 14 1.2	-0.28	16 28.1	31	5 5 40.01	-0.563	+21 6 58.5	-0.87	1
32	5 9 12.48	-0.029	+21 13 54.2	-0.31	16 24.1	32	5 5 26.32	-0.578	+21 6 37.5	-0.89	1
Day of the Month.			7th.	15th.	23d.	Day of the Month.			1st.	9th.	17th.
			"	"	"				"	"	"
Semidiameter			8.56	8.69	8.82	Semidiameter			8.95	9.08	9.20
Horizontal Parallax . .			0.97	0.99	1.00	Horizontal Parallax . .			1.02	1.03	1.05

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

GREENWICH MEAN TIME.

1

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Least semidiameter,
Greatest semidiameter,

January 24, 1".61
July 28, 1".78

Least horizontal parallax, January 24, 0"
Greatest horizontal parallax, July 28, 0".

[Eph 13]

MEAN TIME.

Greatest semidiameter,
Least semidiameter,
1913—12

January 15, 1".35
July 18, 1".95

Greatest horizontal parallax, January 15, 0".30
Least horizontal parallax, July 18, 0".28

[Eph 13]

MERCURY.

MEAN NOON.

MERCURY.

GREENWICH MEAN NOON.

MERCURY.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Interme- diate Date.
Apr.	° ' "	° ' "	' "	° ' "	' "			
	1 202 12 48.7	3 21 35.7	— 9 54.5	+2 58 54.2	—22 22.0	9.624 9187	9.772 5935	9.773 1828
	2 205 32 8.9	3 17 8.4	8 53.3	2 36 29.6	22 26.5	9.629 6323	9.774 0173	9.775 0877
	3 208 47 12.4	3 13 2.1	7 46.5	2 14 2.5	22 27.0	9.634 0817	9.776 3843	9.777 8970
	4 211 58 19.7	3 9 15.8	6 35.1	1 51 36.7	22 23.9	9.638 2644	9.779 6153	9.781 5290
	5 215 5 50.4	3 5 48.7	5 20.2	1 29 15.7	22 17.6	9.642 1790	9.783 6276	9.785 9004
	6 218 10 3.1	3 2 39.9	— 4 3.0	+1 7 2.4	—22 8.7	9.645 8250	9.788 3370	9.790 9270
	7 221 11 15.8	2 59 48.5	2 44.2	0 44 59.1	21 57.5	9.649 2022	9.793 6603	9.796 5270
	8 224 9 45.6	2 57 13.8	1 24.8	0 23 8.1	21 44.2	9.652 3109	9.799 5175	9.802 6225
	9 227 5 48.8	2 54 55.1	— 0 5.6	+0 1 31.3	21 29.2	9.655 1516	9.805 8330	9.809 1404
	10 229 59 41.0	2 52 51.7	+ 1 12.7	—0 19 49.7	21 12.6	9.657 7252	9.812 5367	9.816 0139
	11 232 51 37.3	2 51 3.2	+ 2 29.4	—0 40 53.5	—20 54.6	9.660 0327	9.819 5645	9.823 1816
	12 235 41 52.2	2 49 29.0	3 43.9	1 1 38.6	20 35.4	9.662 0750	9.826 8585	9.830 5888
	13 238 30 39.9	2 48 8.6	4 55.5	1 22 3.8	20 14.9	9.663 8531	9.834 3667	9.838 1866
	14 241 18 13.9	2 47 1.6	6 3.8	1 42 8.1	19 53.4	9.665 3681	9.842 0434	9.845 9320
	15 244 4 47.4	2 46 7.7	7 8.2	2 1 50.3	19 30.9	9.666 6208	9.849 8480	9.853 7872
	16 246 50 33.5	2 45 26.5	+ 8 8.3	—2 21 9.4	—19 7.3	9.667 6119	9.857 7457	9.861 7198
	17 249 35 44.7	2 44 57.9	9 3.6	2 40 4.4	18 42.6	9.668 3421	9.865 7061	9.869 7015
	18 252 20 33.6	2 44 41.8	9 53.7	2 58 34.2	18 16.9	9.668 8119	9.873 7032	9.877 7084
	19 255 5 12.5	2 44 38.0	10 38.3	3 16 37.7	17 50.0	9.669 0215	9.881 7147	9.885 7198
	20 257 49 53.6	2 44 46.4	11 17.0	3 34 13.8	17 22.0	9.668 9710	9.889 7215	9.893 7180
	21 260 34 49.2	2 45 6.9	+11 49.6	—3 51 21.3	—16 52.8	9.668 6604	9.897 7076	9.901 6886
	22 263 20 11.5	2 45 39.6	12 15.6	4 7 58.9	16 22.2	9.668 0898	9.905 6595	9.909 6189
	23 266 6 12.6	2 46 24.7	12 34.9	4 24 5.3	15 50.2	9.667 2587	9.913 5655	9.917 4983
	24 268 53 5.1	2 47 22.4	12 47.2	4 39 38.9	15 16.6	9.666 1662	9.921 4162	9.925 3183
	25 271 41 1.5	2 48 32.6	12 52.2	4 54 38.0	14 41.3	9.664 8118	9.929 2039	9.933 0720
	26 274 30 14.6	2 49 55.6	+12 49.7	—5 9 0.9	—14 4.1	9.663 1948	9.936 9219	9.940 7529
	27 277 20 57.2	2 51 31.8	12 39.7	5 22 45.5	13 24.8	9.661 3144	9.944 5645	9.948 3561
	28 280 13 22.8	2 53 21.6	12 22.1	5 35 49.6	12 43.1	9.659 1694	9.952 1272	9.955 8775
	29 283 7 45.1	2 55 25.3	11 56.7	5 48 10.8	11 58.9	9.656 7588	9.959 6064	9.963 3135
	30 286 4 18.1	2 57 43.3	11 23.5	5 59 46.3	11 11.8	9.654 0817	9.966 9984	9.970 6608
May	1 289 3 16.6	3 0 16.1	+10 42.6	—6 10 33.2	—10 21.6	9.651 1372	9.974 3004	9.977 9168
	2 292 4 55.5	3 3 4.2	9 54.0	6 20 28.3	9 28.0	9.647 9243	9.981 5095	9.985 0783
	3 295 9 30.4	3 6 8.3	8 57.8	6 29 27.9	8 30.6	9.644 4428	9.988 6230	9.992 1433
	4 298 17 17.6	3 9 28.9	7 54.3	6 37 28.0	7 29.0	9.640 6925	9.995 6387	9.999 1088
	5 301 28 34.0	3 13 6.8	6 44.0	6 44 24.3	6 22.9	9.636 6737	0.002 5534	0.005 9719
	6 304 43 37.1	3 17 2.5	+ 5 27.2	—6 50 12.1	— 5 11.8	9.632 3874	0.009 3640	0.012 7293
	7 308 2 45.2	3 21 16.8	4 4.4	6 54 46.0	3 55.2	9.627 8352	0.016 0673	0.019 3776
	8 311 26 17.3	3 25 50.5	2 36.4	6 58 0.5	2 32.8	9.623 0199	0.022 6595	0.025 9125
	9 314 54 33.0	3 30 44.1	+ 1 4.2	6 59 49.5	— 1 3.9	9.617 9455	0.029 1360	0.032 3295
	10 318 27 52.5	3 35 58.4	— 0 31.2	7 0 6.2	+ 0 31.8	9.612 6173	0.035 4922	0.038 6233
	11 322 6 37.0	3 41 34.2	— 2 8.5	—6 58 43.5	+ 2 14.8	9.607 0425	0.041 7220	0.044 7876
	12 325 51 8.2	3 47 31.7	3 46.2	6 55 33.9	4 5.6	9.601 2308	0.047 8191	0.050 8155
	13 329 41 47.9	3 53 51.5	5 22.6	6 50 29.5	6 4.7	9.595 1944	0.053 7757	0.056 6987
	14 333 38 58.7	4 0 33.8	6 55.8	6 43 21.8	8 12.2	9.588 9485	0.059 5834	0.062 4283
	15 337 43 3.1	4 7 38.7	8 23.5	6 34 2.3	10 28.3	9.582 5117	0.065 2321	0.067 9935
	16 341 54 23.6	4 15 5.8	— 9 43.2	—6 22 22.4	+12 53.1	9.575 9071	0.070 7109	0.073 3827
	17 346 13 22.0	4 22 54.4	—10 52.5	—6 8 13.3	+15 26.4	9.569 1625	0.076 0073	0.078 5828

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GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
							At Date.	At Intermediate Date.	
July	1	212 4 24.7	3 9 9.0	— 6 32.8	+1 50 54.7	—22 23.7	9.638 3901	9.971 4439	9.967 6005
	2	215 11 49.0	3 5 42.4	5 17.8	1 28 33.9	22 17.4	9.642 2965	9.963 7388	9.959 8595
	3	218 15 55.9	3 2 34.1	4 0.5	1 6 20.8	22 8.4	9.645 9342	9.955 9632	9.952 0506
	4	221 17 3.3	2 59 43.3	2 41.7	0 44 17.9	21 57.1	9.649 3030	9.948 1225	9.944 1795
	5	224 15 28.2	2 57 9.1	1 22.3	0 22 27.4	21 43.8	9.652 4033	9.940 2225	9.936 2524
	6	227 11 27.0	2 54 50.9	— 0 3.1	+0 0 51.0	—21 28.8	9.655 2357	9.932 2700	9.928 2762
	7	230 5 15.3	2 52 48.1	+ 1 15.1	—0 20 29.5	21 12.1	9.657 8010	9.924 2719	9.920 2583
	8	232 57 8.2	2 51 0.0	2 31.8	0 41 32.7	20 54.0	9.660 1002	9.916 2365	9.912 2077
	9	235 47 20.2	2 49 26.3	3 46.2	1 2 17.2	20 34.8	9.662 1343	9.908 1730	9.904 1339
	10	238 36 5.4	2 48 6.3	4 57.7	1 22 41.8	20 14.3	9.663 9043	9.900 0917	9.896 0482
	11	241 23 37.3	2 46 59.7	+ 6 5.9	—1 42 45.4	—19 52.7	9.665 4112	9.892 0050	9.887 9638
	12	244 10 9.2	2 46 6.2	7 10.1	2 2 26.9	19 30.1	9.666 6557	9.883 9265	9.879 8953
	13	246 55 53.9	2 45 25.4	8 10.0	2 21 45.3	19 6.4	9.667 6386	9.875 8725	9.871 8604
	14	249 41 4.2	2 44 57.2	9 5.2	2 40 39.4	18 41.7	9.668 3606	9.867 8615	9.863 8785
	15	252 25 52.6	2 44 41.5	9 55.2	2 59 8.4	18 16.0	9.668 8222	9.859 9145	9.855 9726
	16	255 10 31.4	2 44 38.1	+10 39.6	—3 17 11.1	—17 49.2	9.669 0237	9.852 0558	9.848 1677
	17	257 55 12.8	2 44 46.8	11 18.2	3 34 46.3	17 21.1	9.668 9652	9.844 3123	9.840 4937
	18	260 40 9.0	2 45 7.7	11 50.5	3 51 52.9	16 51.9	9.668 6466	9.836 7160	9.832 9837
	19	263 25 32.3	2 45 40.8	12 16.3	4 8 29.6	16 21.3	9.668 0677	9.829 3016	9.825 6747
	20	266 11 34.9	2 46 26.3	12 35.4	4 24 35.0	15 49.3	9.667 2283	9.822 1084	9.818 6083
	21	268 58 29.2	2 47 24.3	+12 47.4	—4 40 7.5	—15 15.6	9.666 1277	9.815 1804	9.811 8307
	22	271 46 27.7	2 48 35.0	12 52.2	4 55 5.6	14 40.2	9.664 7652	9.808 5657	9.805 3920
	23	274 35 43.3	2 49 58.5	12 49.5	5 9 27.3	14 2.8	9.663 1400	9.802 3167	9.799 3470
	24	277 26 29.0	2 51 35.1	12 39.3	5 23 10.6	13 23.4	9.661 2512	9.796 4904	9.793 7546
	25	280 18 58.1	2 53 25.3	12 21.4	5 36 13.4	12 41.7	9.659 0980	9.791 1476	9.788 6773
	26	283 13 24.2	2 55 29.4	+11 55.8	—5 48 33.2	—11 57.4	9.656 6791	9.786 3520	9.784 1800
	27	286 10 1.6	2 57 47.8	11 22.4	6 0 7.3	11 10.2	9.653 9937	9.782 1696	9.780 3291
	28	289 9 4.8	3 0 21.0	10 41.2	6 10 52.7	10 19.9	9.651 0409	9.778 6671	9.777 1918
	29	292 10 48.9	3 3 9.7	9 52.3	6 20 46.0	9 26.2	9.647 8198	9.775 9113	9.774 8334
	30	295 15 29.6	3 6 14.3	8 55.9	6 29 43.8	8 28.7	9.644 3300	9.773 9658	9.773 3158
	31	298 23 23.1	3 9 35.5	+ 7 52.3	—6 37 42.0	— 7 27.0	9.640 5714	9.772 8902	9.772 6954
Aug.	1	301 34 46.4	3 13 13.9	6 41.7	6 44 36.3	6 20.7	9.636 5443	9.772 7375	9.773 0217
	2	304 49 56.9	3 17 10.2	5 24.6	6 50 21.8	5 9.5	9.632 2497	9.773 5525	9.774 3338
	3	308 9 12.9	3 21 25.1	4 1.7	6 54 53.4	3 52.8	9.627 6893	9.775 3688	9.776 6600
	4	311 32 53.5	3 25 59.4	2 33.6	6 58 5.3	2 30.1	9.622 8658	9.778 2090	9.780 0162
	5	315 1 18.3	3 30 53.7	+ 1 1.3	—6 59 51.4	— 1 1.1	9.617 7833	9.782 0813	9.784 4032
	6	318 34 47.7	3 36 8.7	— 0 34.2	7 0 5.1	+ 0 34.8	9.612 4473	9.786 9799	9.789 8087
	7	322 13 42.7	3 41 45.1	2 11.6	6 58 39.3	2 18.1	9.606 8651	9.792 8857	9.796 2064
	8	325 58 25.0	3 47 43.3	3 49.3	6 55 26.3	4 9.2	9.601 0463	9.799 7654	9.803 5564
	9	329 49 16.6	3 54 3.8	5 25.6	6 50 18.1	6 8.5	9.595 0031	9.807 5724	9.811 8061
	10	333 46 39.9	4 0 46.8	— 6 58.6	—6 43 6.4	+ 8 16.3	9.588 7509	9.816 2492	9.820 8930
	11	337 50 57.6	4 7 52.3	.8 26.1	6 33 42.7	10 32.7	9.582 3085	9.825 7285	9.830 7461
	12	342 2 32.0	4 15 20.1	9 45.6	6 21 58.2	12 57.8	9.575 6992	9.835 9357	9.841 2871
	13	346 21 45.0	4 23 9.3	10 54.4	6 7 44.4	15 31.3	9.568 9509	9.846 7898	9.852 4331
	14	350 48 57.5	4 31 18.9	11 50.0	5 50 53.1	18 12.6	9.562 0971	9.858 2062	9.864 0982
	15	355 24 28.9	4 39 47.0	—12 29.4	—5 31 17.1	+21 0.7	9.555 1772	9.870 0983	9.876 1954
	16	0 8 36.6	4 48 31.0	—12 49.9	—5 8 50.1	+23 54.2	9.548 2371	9.882 3785	9.888 6367

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GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
											At Date.	At Interme- diate Date.
ov. 16	20	45	11.8	5 25 2.5	-10 19.0	-3	8	36.8	+35 36.5	9.521 2536	9.864 7686	9.860 1799
17	26	14	42.2	5 33 55.8	8 39.4	2	31	41.3	38 12.3	9.515 1632	9.855 8123	9.851 6971
18	31	52	56.8	5 42 29.4	6 37.3	1	52	18.1	40 30.8	9.509 4763	9.847 8662	9.844 3515
19	37	39	31.1	5 50 33.6	4 16.2	1	10	47.5	42 26.1	9.504 2805	9.841 1847	9.838 3964
20	43	33	50.5	5 57 57.8	- 1 41.1	0	27	35.6	43 52.5	9.499 6634	9.836 0155	9.834 0686
21	49	35	9.8	6 4 31.6	+ 1 1.5	+0	16	46.0	+44 44.5	9.495 7089	9.832 5793	9.831 5676
22	55	42	33.3	6 10 4.4	3 44.0	1	1	40.4	44 57.4	9.492 4940	9.831 0490	9.831 0342
23	61	54	55.0	6 14 26.4	6 18.1	1	46	26.8	44 28.0	9.490 0847	9.831 5288	9.832 5331
24	68	10	59.7	6 17 29.1	8 35.6	2	30	21.8	43 14.6	9.488 5327	9.834 0417	9.836 0440
25	74	29	24.8	6 19 6.1	10 29.0	3	12	41.6	41 17.8	9.487 8725	9.838 5243	9.841 4623
26	80	48	42.0	6 19 13.1	+11 52.0	+3	52	43.7	+38 40.0	9.488 1188	9.844 8338	9.848 6109
27	87	7	20.7	6 17 49.0	12 40.2	4	29	49.5	35 25.9	9.489 2661	9.852 7628	9.857 2570
28	93	23	50.4	6 14 55.5	12 51.6	5	3	25.5	31 41.7	9.491 2888	9.862 0597	9.867 1363
29	99	36	43.7	6 10 37.3	12 26.6	5	33	5.3	27 34.9	9.494 1428	9.872 4525	9.877 9743
30	105	44	39.5	6 5 1.8	11 27.7	5	58	30.2	23 13.3	9.497 7681	9.883 6688	9.889 5046
Dec. 1	111	46	24.9	5 58 18.3	+ 9 59.3	+6	19	29.3	+18 44.8	9.502 0923	9.895 4520	9.901 4832
2	117	40	57.2	5 50 37.5	8 7.2	6	35	59.6	14 16.7	9.507 0342	9.907 5724	9.913 6960
3	123	27	24.7	5 42 10.9	5 57.9	6	48	4.8	9 55.5	9.512 5075	9.919 8326	9.925 9628
4	129	5	7.5	5 33 10.0	3 37.9	6	55	54.4	5 46.3	9.518 4242	9.932 0695	9.938 1374
5	134	33	36.9	5 23 45.9	+ 1 13.8	6	59	42.5	+ 1 52.8	9.524 6979	9.944 1530	9.950 1046
6	139	52	35.0	5 14 9.0	- 1 8.8	+6	59	46.3	- 1 42.1	9.531 2454	9.955 9823	9.961 7777
7	145	1	53.5	5 4 28.3	3 24.9	6	56	25.0	4 57.1	9.537 9894	9.967 4834	9.973 0935
8	150	1	32.7	4 54 51.4	5 30.5	6	49	59.0	7 51.6	9.544 8588	9.978 6033	9.984 0089
9	154	51	39.7	4 45 24.8	7 22.7	6	40	48.7	10 25.8	9.551 7897	9.989 3072	9.994 4960
10	159	32	27.4	4 36 13.6	8 59.5	6	29	14.1	12 40.4	9.558 7254	9.999 5738	0.004 5397
11	164	4	13.3	4 27 21.7	-10 19.6	+6	15	34.1	-14 36.7	9.565 6166	0.009 3933	0.014 1345
12	168	27	18.1	4 18 51.8	11 22.5	6	0	6.4	16 16.0	9.572 4208	0.018 7637	0.023 2816
13	172	42	4.8	4 10 45.9	12 8.4	5	43	7.3	17 39.8	9.579 1017	0.027 6893	0.031 9880
14	176	48	58.2	4 3 5.3	12 37.6	5	24	51.5	18 49.6	9.585 6286	0.036 1790	0.040 2639
15	180	48	23.9	3 55 50.5	12 51.0	5	5	32.3	19 47.0	9.591 9760	0.044 2445	0.048 1226
16	184	40	47.7	3 49 1.6	-12 49.8	+4	45	21.2	-20 33.4	9.598 1231	0.051 9000	0.055 5786
17	188	26	35.6	3 42 38.4	12 35.2	4	24	28.7	21 10.1	9.604 0530	0.059 1604	0.062 6473
18	192	6	12.9	3 36 40.4	12 8.4	4	3	3.9	21 38.3	9.609 7520	0.066 0413	0.069 3444
19	195	40	4.6	3 31 6.9	11 30.9	3	41	14.6	21 59.1	9.615 2092	0.072 5588	0.075 6862
20	199	8	34.7	3 25 57.1	10 44.0	3	19	7.7	22 13.6	9.620 4161	0.078 7285	0.081 6877
21	202	32	6.3	3 21 10.0	- 9 49.1	+2	56	49.1	-22 22.6	9.625 3665	0.084 5658	0.087 3645
22	205	51	1.8	3 16 44.7	8 47.3	2	34	24.0	22 26.9	9.630 0556	0.090 0856	0.092 7309
23	209	5	42.6	3 12 40.3	7 40.0	2	11	56.8	22 26.9	9.634 4802	0.095 3021	0.097 8009
24	212	16	29.0	3 8 55.9	6 28.2	1	49	31.4	22 23.4	9.638 6379	0.100 2289	0.102 5877
25	215	23	40.6	3 5 30.5	5 13.1	1	27	11.0	22 17.0	9.642 5275	0.104 8787	0.107 1034
26	218	27	36.0	3 2 23.3	- 3 55.7	+1	4	58.4	-22 7.8	9.646 1485	0.109 2633	0.111 3598
27	221	28	33.0	2 59 33.5	2 36.8	0	42	56.2	21 56.4	9.649 5007	0.113 3942	0.115 3678
28	224	26	48.6	2 57 0.3	- 1 17.4	+0	21	6.4	21 43.0	9.652 5843	0.117 2819	0.119 1375
29	227	22	39.0	2 54 43.0	+ 0 1.8	0	0	29.1	21 27.8	9.655 4001	0.120 9359	0.122 6782
30	230	16	19.9	2 52 41.1	1 20.0	0	21	48.6	21 11.0	9.657 9490	0.124 3655	0.125 9987
31	233	8	6.3	2 50 54.0	+ 2 36.5	0	42	50.6	-20 52.9	9.660 2318	0.127 5788	0.129 1068
32	235	58	12.7	2 49 21.1	+ 3 50.7	-1	3	33.9	-20 33.5	9.662 2495	0.130 5835	0.132 0098

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GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—							
	°	'	"			°	'	"			At Date.	At Intermediate Date.						
Jan.	0	29	9	1.9	1	35	53.6	-3	0.7	-2	28	23.2	+3	53.4	9.859 8923	0.002 6843	9.999 7382	
	2	32	20	52.2	1	35	56.8	3	0.8	2	20	22.8	4	7.0	9.859 7296	9.996 7632	9.993 7586	
	4	35	32	48.9	1	36	0.0	2	58.7	2	11	55.7	4	19.9	9.859 5655	9.990 7239	9.987 6586	
	6	38	44	52.2	1	36	3.3	2	54.4	2	3	3.6	4	32.0	9.859 4006	9.984 5621	9.981 4339	
	8	41	57	2.0	1	36	6.6	2	47.8	1	53	48.0	4	43.3	9.859 2354	9.978 2736	9.975 0805	
	10	45	9	18.5	1	36	9.9	-2	39.1	-1	44	10.7	+4	53.8	9.859 0703	9.971 8539	9.968 5935	
	12	48	21	41.7	1	36	13.3	2	28.4	1	34	13.4	5	3.3	9.858 9060	9.965 2988	9.961 9693	
	14	51	34	11.8	1	36	16.8	2	15.9	1	23	57.9	5	11.9	9.858 7429	9.958 6046	9.955 2043	
	16	54	46	48.8	1	36	20.3	2	1.8	1	13	26.2	5	19.5	9.858 5815	9.951 7678	9.948 2946	
	18	57	59	32.9	1	36	23.8	1	46.1	1	2	40.2	5	26.2	9.858 4223	9.944 7843	9.941 2365	
	20	61	12	24.0	1	36	27.3	-1	28.9	0	51	41.9	+5	31.9	9.858 2659	9.937 6508	9.934 0268	
	22	64	25	22.2	1	36	30.9	1	10.6	0	40	33.3	5	36.5	9.858 1128	9.930 3642	9.926 6625	
	24	67	38	27.6	1	36	34.5	0	51.5	0	29	16.6	5	40.0	9.857 9633	9.922 9212	9.919 1399	
	26	70	51	40.3	1	36	38.2	0	31.7	0	17	53.9	5	42.5	9.857 8182	9.915 3181	9.911 4551	
	28	74	5	0.2	1	36	41.8	0	11.5	0	6	27.3	5	43.9	9.857 6777	9.907 5503	9.903 6030	
	30	77	18	27.3	1	36	45.4	+0	8.9	+0	5	0.9	+5	44.2	9.857 5424	9.899 6124	9.895 5777	
	Feb.	1	80	32	1.6	1	36	49.0	0	29.2	0	16	28.6	5	43.3	9.857 4127	9.891 4982	9.887 3730
		3	83	45	43.1	1	36	52.5	0	49.1	0	27	53.5	5	41.4	9.857 2889	9.883 2013	9.878 9824
5		86	59	31.6	1	36	56.0	1	8.4	0	39	13.5	5	38.4	9.857 1716	9.874 7155	9.870 3996	
7		90	13	27.1	1	36	59.5	1	26.9	0	50	26.4	5	34.3	9.857 0611	9.866 0340	9.861 6179	
9		93	27	29.5	1	37	2.9	+1	44.2	+1	1	30.0	+5	29.1	9.856 9577	9.857 1504	9.852 6308	
11		96	41	38.5	1	37	6.1	2	0.2	1	12	22.1	5	22.8	9.856 8618	9.848 0583	9.843 4323	
13		99	55	54.0	1	37	9.3	2	14.7	1	23	0.6	5	15.5	9.856 7738	9.838 7520	9.834 0167	
15		103	10	15.8	1	37	12.4	2	27.5	1	33	23.5	5	7.2	9.856 6939	9.829 2258	9.824 3786	
17		106	24	43.5	1	37	15.3	2	38.4	1	43	28.7	4	57.8	9.856 6223	9.819 4746	9.814 5132	
19		109	39	16.8	1	37	18.0	+2	47.3	+1	53	14.2	+4	47.5	9.856 5593	9.809 4942	9.804 4171	
21		112	53	55.4	1	37	20.5	2	54.1	2	2	38.1	4	36.3	9.856 5051	9.799 2816	9.794 0872	
23		116	8	38.9	1	37	22.9	2	58.6	2	11	38.6	4	24.1	9.856 4599	9.788 8335	9.783 5201	
25	119	23	26.9	1	37	25.0	3	0.8	2	20	13.9	4	11.0	9.856 4239	9.778 1465	9.772 7121		
27	122	38	19.0	1	37	26.9	3	0.7	2	28	22.2	3	57.1	9.856 3971	9.767 2164	9.761 6589		
Mar.	1	125	53	14.5	1	37	28.5	+2	58.3	+2	36	2.0	+3	42.5	9.856 3796	9.756 0391	9.750 3566	
	3	129	8	13.0	1	37	29.9	2	53.6	2	43	11.8	3	27.1	9.856 3716	9.744 6111	9.738 8021	
	5	132	23	13.9	1	37	31.0	2	46.6	2	49	50.2	3	11.1	9.856 3730	9.732 9294	9.726 9930	
	7	135	38	16.7	1	37	31.7	2	37.5	2	55	55.8	2	54.4	9.856 3839	9.720 9928	9.714 9289	
	9	138	53	20.6	1	37	32.1	2	26.4	3	1	27.5	2	37.2	9.856 4041	9.708 8017	9.702 6118	
	11	142	8	25.1	1	37	32.2	+2	13.4	+3	6	24.1	+2	19.4	9.856 4336	9.696 3598	9.690 0463	
	13	145	23	29.5	1	37	32.0	1	58.7	3	10	44.8	2	1.2	9.856 4724	9.683 6726	9.677 2400	
	15	148	38	33.0	1	37	31.4	1	42.4	3	14	28.7	1	42.6	9.856 5202	9.670 7504	9.664 2059	
	17	151	53	35.0	1	37	30.5	1	24.9	3	17	35.1	1	23.7	9.856 5770	9.657 6092	9.650 9634	
	19	155	8	34.8	1	37	29.2	1	6.3	3	20	3.3	1	4.5	9.856 6426	9.644 2716	9.637 5378	
	21	158	23	31.7	1	37	27.6	+0	46.8	+3	21	53.0	+0	45.1	9.856 7167	9.630 7664	9.623 9624	
	23	161	38	25.0	1	37	25.6	0	26.8	3	23	3.8	0	25.6	9.856 7990	9.617 1312	9.610 2788	
25	164	53	14.1	1	37	23.3	+0	6.4	3	23	35.5	+0	6.1	9.856 8894	9.603 4119	9.596 5373		
27	168	7	58.1	1	37	20.6	0	14.1	3	23	28.2	0	13.4	9.856 9876	9.589 6628	9.582 7970		
29	171	22	36.4	1	37	17.6	0	34.4	3	22	41.8	0	32.9	9.857 0931	9.575 9491	9.569 1292		
31	174	37	8.5	1	37	14.3	0	54.2	+3	21	16.5	0	52.3	9.857 2057	9.562 3483	9.555 6181		
Apr.	2	177	51	33.7	1	37	10.7	-1	13.3	+3	19	12.7	-1	11.4	9.857 3250	9.548 9516	9.542 3626	

VENUS.

MEAN NOON.

Date.	Heliocentric Longitude. Mean Equinox of Date.		
	°	'	"
Apr. 2	177	51	33.7
4	181	5	51.3
6	184	20	0.8
8	187	34	1.8
10	190	47	53.8
12	194	1	36.3
14	197	15	8.9
16	200	28	31.3
18	203	41	43.2
20	206	54	44.5
22	210	7	34.9
24	213	20	14.4
26	216	32	42.9
28	219	45	0.4
30	222	57	6.9
May 2	226	9	2.5
4	229	20	47.5
6	232	32	22.0
8	235	43	46.4
10	238	55	0.8
12	242	6	5.7
14	245	17	1.4
16	248	27	48.4
18	251	38	27.2
20	254	48	58.2
22	257	59	21.9
24	261	9	38.9
26	264	19	49.8
28	267	29	55.0
30	270	39	55.2
June 1	273	49	50.9
3	276	59	42.8
5	280	9	31.4
7	283	19	17.3
9	286	29	1.0
11	289	38	43.2
13	292	48	24.3
15	295	58	5.0
17	299	7	45.7
19	302	17	26.9
21	305	27	9.1
23	308	36	52.7
25	311	46	38.2
27	314	56	25.9
29	318	6	16.2
July 1	321	16	9.5
3	324	26	6.1

VENUS.

MEAN NOON.

VENUS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	°	'	"			'	"	°			'	"
Oct.	1	108	31	20.2	1 37 17.6	+2 44.4	+1 49 51.5	+4 51.2	9 856 5586	0.126 2054	0.128 0100	
	3	111	45	58.2	1 37 20.3	2 51.9	1 59 23.3	4 40.3	9.856 5009	0.129 7940	0.131 5575	
	5	115	0	41.3	1 37 22.7	2 57.2	2 8 32.2	4 28.5	9.856 4521	0.133 3008	0.135 0243	
	7	118	15	29.0	1 37 24.9	3 0.3	2 17 16.6	4 15.7	9.856 4125	0.136 7283	0.138 4130	
	9	121	30	20.9	1 37 26.9	3 1.0	2 25 34.6	4 2.1	9.856 3822	0.140 0785	0.141 7250	
	11	124	45	16.5	1 37 28.6	+2 59.4	+2 33 24.7	+3 47.8	9.856 3614	0.143 3527	0.144 9618	
	13	128	0	15.3	1 37 30.1	2 55.5	2 40 45.2	3 32.6	9.856 3500	0.146 5525	0.148 1250	
	15	131	15	16.7	1 37 31.2	2 49.3	2 47 34.7	3 16.8	9.856 3480	0.149 6793	0.151 2155	
	17	134	30	20.1	1 37 32.1	2 40.9	2 53 52.0	3 0.3	9.856 3556	0.152 7337	0.154 2341	
	19	137	45	24.9	1 37 32.6	2 30.5	2 59 35.7	2 43.2	9.856 3727	0.155 7167	0.157 1816	
	21	141	0	30.5	1 37 32.8	+2 18.2	+3 4 44.7	+2 25.7	9.856 3992	0.158 6290	0.160 0588	
Nov.	23	144	15	36.2	1 37 32.7	2 4.1	3 9 18.1	2 7.7	9.856 4350	0.161 4711	0.162 8659	
	25	147	30	41.3	1 37 32.3	1 48.3	3 13 15.0	1 49.2	9.856 4801	0.164 2433	0.165 6034	
	27	150	45	45.1	1 37 31.5	1 31.2	3 16 34.6	1 30.3	9.856 5343	0.166 9463	0.168 2721	
	29	154	0	47.0	1 37 30.3	1 12.9	3 19 16.2	1 11.3	9.856 5973	0.169 5810	0.170 8732	
	31	157	15	46.1	1 37 28.7	+0 53.7	+3 21 19.4	+0 52.0	9.856 6690	0.172 1487	0.173 4077	
	2	160	30	41.8	1 37 26.8	0 33.8	3 22 43.8	0 32.5	9.856 7492	0.174 6505	0.175 8773	
	4	163	45	33.4	1 37 24.6	+0 13.5	3 23 29.2	+0 12.9	9.856 8375	0.177 0882	0.178 2835	
	6	167	0	20.2	1 37 22.1	−0 7.0	3 23 35.5	−0 6.7	9.856 9337	0.179 4635	0.180 6283	
	8	170	15	1.6	1 37 19.2	0 27.4	3 23 2.7	0 26.2	9.857 0375	0.181 7780	0.182 9128	
	10	173	29	36.8	1 37 15.9	−0 47.4	+3 21 51.0	−0 45.6	9.857 1485	0.184 0328	0.185 1381	
	12	176	44	5.3	1 37 12.4	1 6.8	3 20 0.6	1 4.8	9.857 2664	0.186 2290	0.187 3055	
Dec.	14	179	58	26.4	1 37 8.6	1 25.3	3 17 32.0	1 23.7	9.857 3907	0.188 3677	0.189 4157	
	16	183	12	39.5	1 37 4.5	1 42.7	3 14 25.8	1 42.4	9.857 5211	0.190 4496	0.191 4694	
	18	186	26	44.2	1 37 0.2	1 58.9	3 10 42.6	2 0.7	9.857 6572	0.192 4751	0.193 4668	
	20	189	40	40.0	1 36 55.6	−2 13.5	+3 6 23.2	−2 18.6	9.857 7985	0.194 4445	0.195 4082	
	22	192	54	26.4	1 36 50.8	2 26.4	3 1 28.5	2 36.0	9.857 9445	0.196 3580	0.197 2938	
	24	196	8	3.0	1 36 45.8	2 37.4	2 55 59.5	2 52.8	9.858 0948	0.198 2158	0.199 1239	
	26	199	21	29.4	1 36 40.7	2 46.4	2 49 57.3	3 9.2	9.858 2489	0.200 0183	0.200 8990	
	28	202	34	45.4	1 36 35.4	2 53.3	2 43 23.2	3 24.8	9.858 4063	0.201 7661	0.202 6197	
	30	205	47	50.8	1 36 30.0	−2 58.1	+2 36 18.5	−3 39.8	9.858 5665	0.203 4599	0.204 2870	
	2	209	0	45.3	1 36 24.5	3 0.6	2 28 44.6	3 54.0	9.858 7290	0.205 1011	0.205 9024	
	4	212	13	28.8	1 36 19.0	3 0.8	2 20 43.1	4 7.4	9.858 8933	0.206 6910	0.207 4670	
	6	215	26	1.3	1 36 13.4	2 58.8	2 12 15.5	4 20.0	9.859 0588	0.208 2305	0.208 9818	
	8	218	38	22.7	1 36 7.9	2 54.5	2 3 23.4	4 31.8	9.859 2250	0.209 7210	0.210 4483	
	10	221	50	33.1	1 36 2.4	−2 48.0	+1 54 8.6	−4 42.8	9.859 3915	0.211 1636	0.211 8671	
	12	225	2	32.6	1 35 57.0	2 39.5	1 44 32.9	4 52.8	9.859 5577	0.212 5589	0.213 2391	
	14	228	14	21.3	1 35 51.7	2 29.0	1 34 38.1	5 1.8	9.859 7230	0.213 9078	0.214 5650	
	16	231	25	59.5	1 35 46.5	2 16.6	1 24 26.1	5 9.9	9.859 8870	0.215 2108	0.215 8452	
	18	234	37	27.3	1 35 41.4	2 2.5	1 13 58.8	5 17.1	9.860 0492	0.216 4681	0.217 0796	
	20	237	48	45.1	1 35 36.4	−1 47.0	+1 3 18.3	−5 23.2	9.860 2090	0.217 6797	0.218 2683	
	22	240	59	53.2	1 35 31.6	1 30.1	0 52 26.5	5 28.3	9.860 3660	0.218 8455	0.219 4112	
	24	244	10	51.9	1 35 27.1	1 12.1	0 41 25.5	5 32.4	9.860 5196	0.219 9654	0.220 5082	
	26	247	21	41.8	1 35 22.8	0 53.2	0 30 17.2	5 35.5	9.860 6695	0.221 0396	0.221 5596	
	28	250	32	23.3	1 35 18.7	0 33.7	0 19 3.8	5 37.6	9.860 8151	0.222 0683	0.222 5657	
	30	253	42	56.7	1 35 14.8	−0 13.8	+0 7 47.4	−5 38.7	9.860 9561	0.223 0520	0.223 5272	
	32	256	53	22.7	1 35 11.2	+0 6.2	−0 3 30.1	−5 38.7	9.861 0920	0.223 9915	0.224 4450	

MARS.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Distance from Earth—	
	°	'	"			°	'	"			At Date.	At Intermedi- ate Date.
Jan. 0	251	31	21.2	32 35.11	+38.2	0	42	44.1	-58.28	0.174 1282	0.381 3358	0.380 6732
2	252	36	38.2	32 41.94	39.6	0	44	40.4	58.01	0.173 3745	0.380 0046	0.379 3300
4	253	42	9.0	32 48.78	41.0	0	46	36.2	57.72	0.172 6216	0.378 6495	0.377 9632
6	254	47	53.4	32 55.65	42.3	0	48	31.3	57.40	0.171 8698	0.377 2710	0.376 5730
8	255	53	51.6	33 2.52	43.5	0	50	25.8	57.04	0.171 1194	0.375 8694	0.375 1602
10	257	0	3.5	33 9.40	+44.7	0	52	19.5	-56.65	0.170 3706	0.374 4456	0.373 7256
12	258	6	29.2	33 16.29	45.8	0	54	12.4	56.24	0.169 6237	0.373 0003	0.372 2698
14	259	13	8.7	33 23.19	46.9	0	56	4.5	55.82	0.168 8791	0.371 5342	0.370 7937
16	260	20	2.0	33 30.08	47.9	0	57	55.7	55.38	0.168 1370	0.370 0483	0.369 2982
18	261	27	9.0	33 36.96	48.8	0	59	46.0	54.90	0.167 3977	0.368 5435	0.367 7843
20	262	34	29.8	33 43.85	+49.7	1	1	35.3	-54.38	0.166 6617	0.367 0208	0.366 2530
22	263	42	4.4	33 50.73	50.4	1	3	23.5	53.83	0.165 9292	0.365 4808	0.364 7044
24	264	49	52.7	33 57.60	51.1	1	5	10.6	53.27	0.165 2005	0.363 9238	0.363 1390
26	265	57	54.8	34 4.45	51.7	1	6	56.6	52.67	0.164 4759	0.362 3502	0.361 5573
28	267	6	10.5	34 11.27	52.3	1	8	41.3	52.04	0.163 7558	0.360 7602	0.359 9590
30	268	14	39.9	34 18.08	+52.7	1	10	24.7	-51.38	0.163 0406	0.359 1537	0.358 3442
Feb. 1	269	23	22.9	34 24.87	53.1	1	12	6.8	50.70	0.162 3304	0.357 5305	0.356 7128
3	270	32	19.4	34 31.63	53.4	1	13	47.5	49.98	0.161 6257	0.355 8911	0.355 0655
5	271	41	29.4	34 38.35	53.6	1	15	26.7	49.23	0.160 9268	0.354 2359	0.353 4024
7	272	50	52.8	34 45.03	53.7	1	17	4.4	48.45	0.160 2340	0.352 5652	0.351 7244
9	274	0	29.5	34 51.67	+53.8	1	18	40.5	-47.64	0.159 5477	0.350 8802	0.350 0325
11	275	10	19.5	34 58.27	53.7	1	20	14.9	46.80	0.158 8682	0.349 1815	0.348 3273
13	276	20	22.6	35 4.83	53.6	1	21	47.7	45.94	0.158 1958	0.347 4699	0.346 6095
15	277	30	38.7	35 11.33	53.3	1	23	18.7	45.05	0.157 5309	0.345 7462	0.344 8802
17	278	41	7.8	35 17.76	53.0	1	24	47.9	44.13	0.156 8739	0.344 0116	0.343 1404
19	279	51	49.8	35 24.14	+52.6	1	26	15.2	-43.18	0.156 2250	0.342 2667	0.341 3906
21	281	2	44.4	35 30.46	52.1	1	27	40.6	42.20	0.155 5846	0.340 5122	0.339 6315
23	282	13	51.6	35 36.71	51.5	1	29	4.0	41.18	0.154 9531	0.338 7484	0.337 8630
25	283	25	11.2	35 42.88	50.8	1	30	25.3	40.13	0.154 3308	0.336 9752	0.336 0850
27	284	36	43.1	35 48.98	50.1	1	31	44.5	39.07	0.153 7180	0.335 1924	0.334 2974
Mar. 1	285	48	27.1	35 55.00	+49.2	1	33	1.6	-37.98	0.153 1150	0.333 4000	0.332 5002
3	287	0	23.0	36 0.93	48.2	1	34	16.4	36.84	0.152 5223	0.331 5981	0.330 6937
5	288	12	30.7	36 6.78	47.2	1	35	28.9	35.68	0.151 9401	0.329 7869	0.328 8778
7	289	24	50.1	36 12.52	46.1	1	36	39.1	34.50	0.151 3687	0.327 9666	0.327 0533
9	290	37	20.8	36 18.17	44.9	1	37	46.9	33.29	0.150 8086	0.326 1380	0.325 2207
11	291	50	2.7	36 23.73	+43.6	1	38	52.3	-32.05	0.150 2599	0.324 3014	0.323 3803
13	293	2	55.6	36 29.17	42.2	1	39	55.1	30.78	0.149 7231	0.322 4575	0.321 5331
15	294	15	59.3	36 34.50	40.7	1	40	55.4	29.50	0.149 1984	0.320 6073	0.319 6801
17	295	29	13.5	36 39.72	39.2	1	41	53.1	28.20	0.148 6862	0.318 7516	0.317 8219
19	296	42	38.1	36 44.81	37.6	1	42	48.2	26.86	0.148 1868	0.316 8910	0.315 9591
21	297	56	12.7	36 49.79	+35.9	1	43	40.5	-25.49	0.147 7005	0.315 0263	0.314 0924
23	299	9	57.2	36 54.64	34.2	1	44	30.1	24.11	0.147 2275	0.313 1574	0.312 2213
25	300	23	51.2	36 59.36	32.4	1	45	17.0	22.72	0.146 7682	0.311 2840	0.310 3455
27	301	37	54.5	37 3.95	30.5	1	46	1.0	21.29	0.146 3229	0.309 4059	0.308 4650
29	302	52	6.9	37 8.39	28.5	1	46	42.1	19.83	0.145 8918	0.307 5227	0.306 5791
31	304	6	28.0	37 12.69	+26.5	1	47	20.3	-18.37	0.145 4751	0.305 6342	0.304 6879
Apr. 2	305	20	57.6	37 16.84	+24.5	1	47	55.6	-16.90	0.145 0733	0.303 7402	0.302 7910

MARS.**GREENWICH MEAN NOON.****2****1882**

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GREENWICH MEAN NOON.

Date	Heliocentric Longitude, Mean Equinox of Date			Daily Motion	Reduc- tion to Orbit.	Heliocentric Latitude			Daily Motion	Logarithm of Radius Vec- tor	Logarithm of Distance from Earth—		
	°	'	"			°	'	"			At Date	At Intermedi- ate Date.	
Jan.	2	267	46	55.8	4 52.75	—10.8	+0	16	0.8	—6.55	0.720 7186	0.793 5280	0.792 9977
	6	268	6	27.1	4 52.90	10.5	0	15	34.6	6.56	0.720 6027	0.792 4072	0.791 7562
	10	268	25	59.1	4 53.05	10.2	0	15	8.3	6.57	0.720 4865	0.791 0449	0.790 2737
	14	268	45	31.7	4 53.21	9.9	0	14	42.0	6.58	0.720 3701	0.789 4431	0.788 5534
	18	269	5	4.9	4 53.37	9.6	0	14	15.7	6.59	0.720 2535	0.787 6049	0.786 5979
	22	269	24	38.7	4 53.53	—9.3	+0	13	49.3	—6.60	0.720 1366	0.785 5328	0.784 4098
	26	269	44	13.1	4 53.68	9.1	0	13	22.9	6.61	0.720 0196	0.783 2293	0.781 9915
Feb.	30	270	3	48.2	4 53.84	8.8	0	12	56.4	6.62	0.719 9024	0.780 6965	0.779 3444
	3	270	23	23.9	4 54.00	8.5	0	12	29.9	6.63	0.719 7850	0.777 9356	0.776 4703
	7	270	43	0.2	4 54.16	8.2	0	12	3.4	6.64	0.719 6675	0.774 9492	0.773 3729
	11	271	2	37.2	4 54.32	—7.9	+0	11	36.8	—6.65	0.719 5498	0.771 7423	0.770 0582
	15	271	22	14.8	4 54.48	7.6	0	11	10.2	6.66	0.719 4319	0.768 3213	0.766 5322
	19	271	41	53.1	4 54.64	7.3	0	10	43.6	6.67	0.719 3139	0.764 6918	0.762 8010
	23	272	1	32.0	4 54.80	7.0	0	10	16.9	6.67	0.719 1957	0.760 8604	0.758 8705
Mar.	27	272	21	11.5	4 54.96	6.7	0	9	50.1	6.68	0.719 0773	0.756 8320	0.754 7454
	3	272	40	51.7	4 55.13	—6.4	+0	9	23.4	—6.69	0.718 9587	0.752 6119	0.750 4326
	7	273	0	32.6	4 55.29	6.1	0	8	56.6	6.70	0.718 8401	0.748 2085	0.745 9407
	11	273	20	14.1	4 55.45	5.8	0	8	29.8	6.71	0.718 7213	0.743 6307	0.741 2800
	15	273	39	56.2	4 55.61	5.5	0	8	2.9	6.71	0.718 6023	0.738 8902	0.736 4628
	19	273	59	38.9	4 55.77	5.2	0	7	36.0	6.72	0.718 4832	0.733 9993	0.731 5013
	23	274	19	22.3	4 55.93	—4.9	+0	7	9.1	—6.73	0.718 3639	0.728 9703	0.726 4078
Apr.	27	274	39	6.4	4 56.10	4.6	0	6	42.2	6.74	0.718 2445	0.723 8151	0.721 1936
	31	274	58	51.1	4 56.26	4.3	0	6	15.2	6.75	0.718 1250	0.718 5457	0.715 8731
	4	275	18	36.5	4 56.42	4.0	0	5	48.2	6.75	0.718 0053	0.713 1782	0.710 4635
	8	275	38	22.5	4 56.58	3.7	0	5	21.2	6.76	0.717 8855	0.707 7315	0.704 9847
	12	275	58	9.2	4 56.75	—3.4	+0	4	54.2	—6.77	0.717 7656	0.702 2259	0.699 4577
	16	276	17	56.5	4 56.91	3.1	0	4	27.1	6.77	0.717 6456	0.696 6830	0.693 9049
	20	276	37	44.5	4 57.08	2.8	0	4	0.0	6.78	0.717 5255	0.691 1256	0.688 3479
May	24	276	57	33.2	4 57.25	2.5	0	3	32.9	6.78	0.717 4053	0.685 5748	0.682 8092
	28	277	17	22.5	4 57.42	2.1	0	3	5.7	6.79	0.717 2850	0.680 0547	0.677 3149
	2	277	37	12.5	4 57.58	—1.8	+0	2	38.6	—6.79	0.717 1645	0.674 5932	0.671 8927
	6	277	57	3.1	4 57.74	1.5	0	2	11.4	6.80	0.717 0439	0.669 2181	0.666 5736
	10	278	16	54.4	4 57.91	1.2	0	1	44.2	6.80	0.716 9232	0.663 9633	0.661 3915
	14	278	36	46.4	4 58.07	0.9	0	1	17.0	6.81	0.716 8025	0.658 8619	0.656 3781
	18	278	56	39.0	4 58.24	0.6	0	0	49.7	6.81	0.716 6817	0.653 9441	0.651 5639
June	22	279	16	32.3	4 58.41	—0.3	+0	0	22.4	—6.82	0.716 5608	0.649 2415	0.646 9807
	26	279	36	26.3	4 58.57	0.0	—0	0	4.8	6.82	0.716 4399	0.644 7859	0.642 6613
	30	279	56	20.9	4 58.74	+0.3	0	0	32.1	6.82	0.716 3189	0.640 6112	0.638 6399
	3	280	16	16.2	4 58.90	0.7	0	0	59.4	6.83	0.716 1978	0.636 7516	0.634 9503
	7	280	36	12.2	4 59.07	1.0	0	1	26.7	6.83	0.716 0766	0.633 2401	0.631 6250
	11	280	56	8.8	4 59.24	+1.3	—0	1	54.1	—6.83	0.715 9553	0.630 1087	0.628 6938
	15	281	16	6.1	4 59.40	1.6	0	2	21.4	6.83	0.715 8340	0.627 3832	0.626 1801
July	19	281	36	4.0	4 59.57	1.9	0	2	48.7	6.83	0.715 7127	0.625 0866	0.624 1053
	23	281	56	2.6	4 59.73	2.2	0	3	16.1	6.84	0.715 5913	0.623 2382	0.622 4880
	27	282	16	1.9	4 59.90	2.5	0	3	43.5	6.84	0.715 4699	0.621 8565	0.621 3454
	1	282	36	1.9	5 0.07	+2.8	—0	4	10.8	—6.84	0.715 3484	0.620 9561	0.620 6897
	5	282	56	2.6	5 0.23	+3.2	—0	4	38.2	—6.84	0.715 2269	0.620 5471	0.620 5284

JUPITER.

GREENWICH MEAN NOON.



SATURN.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	°	'	"			°	'	"			At Date.	At Intermediate Date.
Jan. 2	62	5	42.4	2 12.96	−1 35.6	−1	55	57.0	+3.65	0.957 7852	0.921 0688	0.922 2874
	6	62	14 34.4	2 12.98	1 35.7	1	55	42.4	3.66	0.957 7565	0.923 5475	0.924 8466
	10	62	23 26.3	2 12.99	1 35.8	1	55	27.7	3.67	0.957 7279	0.926 1823	0.927 5523
	14	62	32 18.3	2 13.01	1 35.8	1	55	13.0	3.68	0.957 6993	0.928 9540	0.930 3851
	18	62	41 10.4	2 13.03	1 35.9	1	54	58.2	3.69	0.957 6708	0.931 8431	0.933 3258
	22	62	50 2.6	2 13.04	−1 36.0	−1	54	43.4	+3.71	0.957 6425	0.934 8310	0.936 3565
	26	62	58 54.8	2 13.06	1 36.1	1	54	28.6	3.72	0.957 6144	0.937 9001	0.939 4598
	30	63	7 47.1	2 13.08	1 36.2	1	54	13.7	3.73	0.957 5864	0.941 0334	0.942 6188
	Feb. 3	63	16 39.4	2 13.09	1 36.3	1	53	58.8	3.74	0.957 5585	0.944 2136	0.945 8158
	7	63	25 31.8	2 13.11	1 36.4	1	53	43.8	3.76	0.957 5307	0.947 4232	0.949 0336
	11	63	34 24.3	2 13.13	−1 36.4	−1	53	28.7	+3.77	0.957 5031	0.950 6447	0.952 2545
	15	63	43 16.8	2 13.14	1 36.5	1	53	13.6	3.78	0.957 4756	0.953 8611	0.955 4627
	19	63	52 9.4	2 13.16	1 36.6	1	52	58.5	3.79	0.957 4483	0.957 0576	0.958 6440
	23	64	1 2.1	2 13.18	1 36.7	1	52	43.3	3.80	0.957 4211	0.960 2204	0.961 7853
	27	64	9 54.8	2 13.19	1 36.7	1	52	28.1	3.81	0.957 3940	0.963 3372	0.964 8746
Mar. 3	64	18	47.6	2 13.21	−1 36.8	−1	52	12.8	+3.82	0.957 3670	0.966 3959	0.967 8997
	7	64	27 40.5	2 13.23	1 36.8	1	51	57.5	3.84	0.957 3402	0.969 3844	0.970 8486
	11	64	36 33.5	2 13.24	1 36.9	1	51	42.1	3.85	0.957 3135	0.972 2909	0.973 7100
	15	64	45 26.5	2 13.26	1 37.0	1	51	26.7	3.86	0.957 2869	0.975 1047	0.976 4738
	19	64	54 19.5	2 13.27	1 37.0	1	51	11.2	3.87	0.957 2605	0.977 8164	0.979 1315
	23	65	3 12.6	2 13.29	−1 37.1	−1	50	55.7	+3.88	0.957 2342	0.980 4185	0.981 6765
	27	65	12 5.8	2 13.31	1 37.2	1	50	40.1	3.89	0.957 2081	0.982 9046	0.984 1020
	31	65	20 59.1	2 13.32	1 37.2	1	50	24.5	3.91	0.957 1821	0.985 2678	0.986 4012
	Apr. 4	65	29 52.4	2 13.34	1 37.3	1	50	8.9	3.92	0.957 1563	0.987 5013	0.988 5674
	8	65	38 45.8	2 13.35	1 37.3	1	49	53.2	3.93	0.957 1306	0.989 5988	0.990 5946
	12	65	47 39.2	2 13.36	−1 37.3	−1	49	37.4	+3.94	0.957 1050	0.991 5543	0.992 4774
	16	65	56 32.7	2 13.38	1 37.4	1	49	21.6	3.95	0.957 0796	0.993 3636	0.994 2125
	20	66	5 26.3	2 13.40	1 37.4	1	49	5.8	3.96	0.957 0543	0.995 0237	0.995 7970
	24	66	14 19.9	2 13.41	1 37.4	1	48	49.9	3.97	0.957 0291	0.996 5321	0.997 2286
	28	66	23 13.6	2 13.43	1 37.4	1	48	34.0	3.98	0.957 0041	0.997 8860	0.998 5040
May 2	66	32	7.3	2 13.44	−1 37.5	−1	48	18.1	+4.00	0.956 9792	0.999 0823	0.999 6204
	6	66	41 1.1	2 13.46	1 37.5	1	48	2.1	4.01	0.956 9545	1.000 1180	1.000 5749
	10	66	49 55.0	2 13.47	1 37.5	1	47	46.0	4.02	0.956 9299	1.000 9909	1.001 3659
	14	66	58 48.9	2 13.49	1 37.5	1	47	29.9	4.03	0.956 9055	1.001 6998	1.001 9926
	18	67	7 42.9	2 13.50	1 37.5	1	47	13.7	4.04	0.956 8812	1.002 2443	1.002 4549
	22	67	16 36.9	2 13.52	−1 37.5	−1	46	57.5	+4.05	0.956 8570	1.002 6244	1.002 7529
	26	67	25 31.0	2 13.53	1 37.5	1	46	41.3	4.07	0.956 8330	1.002 8402	1.002 8863
	30	67	34 25.2	2 13.54	1 37.5	1	46	25.0	4.08	0.956 8091	1.002 8910	1.002 8542
	June 3	67	43 19.4	2 13.56	1 37.5	1	46	8.7	4.09	0.956 7853	1.002 7758	1.002 6560
	7	67	52 13.7	2 13.57	1 37.6	1	45	52.3	4.10	0.956 7617	1.002 4948	1.002 2923
	11	68	1 8.0	2 13.59	−1 37.6	−1	45	35.9	+4.11	0.956 7382	1.002 0488	1.001 7646
	15	68	10 2.4	2 13.60	1 37.6	1	45	19.4	4.12	0.956 7149	1.001 4400	1.001 0751
	19	68	18 56.8	2 13.62	1 37.5	1	45	2.9	4.13	0.956 6917	1.000 6702	1.000 2255
	23	68	27 51.3	2 13.63	1 37.5	1	44	46.4	4.14	0.956 6687	0.999 7412	0.999 2173
	27	68	36 45.8	2 13.64	1 37.5	1	44	29.8	4.15	0.956 6458	0.998 6541	0.998 0517
July 1	68	45	40.4	2 13.66	−1 37.5	−1	44	13.1	+4.16	0.956 6231	0.997 4104	0.996 7304
	5	68	54 35.1	2 13.67	−1 37.5	−1	43	56.4	+4.18	0.956 6005	0.996 0122	0.995 2561

SATURN.

GREENWICH MEAN NOON.

URANUS.
GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduc- tion to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vec- tor.	Logarithm of Distance from Earth—	
							At Date.	At Intermedi- ate Date.
	° ' "	"	"	° ' "	"			
Jan. 6	303 18 49.3	39.83	+9.3	—0 35 21.2	—0.35	1.296 6561	1.316 7749	1.317 1628
14	303 24 7.9	39.83	9.3	0 35 24.0	0.35	1.296 6800	1.317 4571	1.317 6569
22	303 29 26.5	39.82	9.3	0 35 26.7	0.35	1.296 7038	1.317 7621	1.317 7728
30	303 34 45.1	39.82	9.2	0 35 29.5	0.34	1.296 7276	1.317 6890	1.317 5107
Feb. 7	303 40 3.7	39.82	9.2	0 35 32.3	0.34	1.296 7513	1.317 2384	1.316 8733
15	303 45 22.2	39.81	+9.2	—0 35 35.0	—0.34	1.296 7750	1.316 4173	1.315 8728
23	303 50 40.7	39.81	9.2	0 35 37.8	0.34	1.296 7986	1.315 2420	1.314 5274
Mar. 3	303 55 59.2	39.81	9.2	0 35 40.5	0.34	1.296 8222	1.313 7314	1.312 8569
11	304 1 17.6	39.80	9.2	0 35 43.3	0.34	1.296 8458	1.311 9075	1.310 8874
19	304 6 36.0	39.80	9.2	0 35 46.0	0.34	1.296 8694	1.309 8010	1.308 6529
27	304 11 54.4	39.80	+9.2	—0 35 48.7	—0.34	1.296 8930	1.307 4476	1.306 1895
Apr. 4	304 17 12.7	39.79	9.2	0 35 51.5	0.34	1.296 9165	1.304 8837	1.303 5356
12	304 22 31.0	39.79	9.2	0 35 54.2	0.34	1.296 9399	1.302 1515	1.300 7376
20	304 27 49.3	39.78	9.2	0 35 56.9	0.34	1.296 9633	1.299 3000	1.297 8447
28	304 33 7.6	39.78	9.2	0 35 59.6	0.34	1.296 9866	1.296 3778	1.294 9057
May 6	304 38 25.8	39.78	+9.2	—0 36 2.3	—0.34	1.297 0099	1.293 4353	1.291 9738
14	304 43 44.0	39.77	9.2	0 36 5.0	0.34	1.297 0331	1.290 5285	1.289 1062
22	304 49 2.1	39.77	9.1	0 36 7.7	0.34	1.297 0562	1.287 7134	1.286 3566
30	304 54 20.2	39.76	9.1	0 36 10.4	0.34	1.297 0793	1.285 0424	1.283 7778
June 7	304 59 38.3	39.76	9.1	0 36 13.0	0.34	1.297 1024	1.282 5696	1.281 4244
15	305 4 56.4	39.75	+9.1	—0 36 15.7	—0.33	1.297 1254	1.280 3484	1.279 3471
23	305 10 14.4	39.75	9.1	0 36 18.4	0.33	1.297 1484	1.278 4255	1.277 5885
July 1	305 15 32.4	39.74	9.1	0 36 21.1	0.33	1.297 1714	1.276 8411	1.276 1881
9	305 20 50.4	39.74	9.1	0 36 23.7	0.33	1.297 1943	1.275 6336	1.275 1808
17	305 26 8.3	39.74	9.1	0 36 26.4	0.33	1.297 2171	1.274 8319	1.274 5887
25	305 31 26.2	39.73	+9.1	—0 36 29.0	—0.33	1.297 2399	1.274 4527	1.274 4253
Aug. 2	305 36 44.0	39.73	9.1	0 36 31.6	0.33	1.297 2627	1.274 5074	1.274 6989
10	305 42 1.9	39.73	9.1	0 36 34.3	0.33	1.297 2854	1.274 9986	1.275 4045
18	305 47 19.7	39.72	9.1	0 36 36.9	0.33	1.297 3080	1.275 9144	1.276 5254
26	305 52 37.4	39.72	9.1	0 36 39.6	0.33	1.297 3306	1.277 2348	1.278 0393
Sept. 3	305 57 55.2	39.72	+9.1	—0 36 42.2	—0.33	1.297 3532	1.278 9344	1.279 9150
11	306 3 12.9	39.71	9.1	0 36 44.8	0.33	1.297 3757	1.280 9756	1.282 1103
19	306 8 30.6	39.71	9.1	0 36 47.4	0.33	1.297 3982	1.283 3133	1.284 5785
27	306 13 48.2	39.70	9.0	0 36 50.0	0.32	1.297 4206	1.285 8998	1.287 2706
Oct. 5	306 19 5.8	39.70	9.0	0 36 52.6	0.32	1.297 4430	1.288 6834	1.290 1304
13	306 24 23.4	39.70	+9.0	—0 36 55.2	—0.32	1.297 4653	1.291 6044	1.293 0985
21	306 29 41.0	39.69	9.0	0 36 57.8	0.32	1.297 4876	1.294 6058	1.296 1196
29	306 34 58.5	39.69	9.0	0 37 0.4	0.32	1.297 5098	1.297 6324	1.299 1369
Nov. 6	306 40 16.0	39.68	9.0	0 37 2.9	0.32	1.297 5320	1.300 6257	1.302 0920
14	306 45 33.4	39.68	9.0	0 37 5.5	0.32	1.297 5541	1.303 5296	1.304 9327
22	306 50 50.9	39.68	+9.0	—0 37 8.1	—0.32	1.297 5762	1.306 2952	1.307 6114
30	306 56 8.3	39.67	9.0	0 37 10.6	0.32	1.297 5982	1.308 8753	1.310 0812
Dec. 8	307 1 25.6	39.67	9.0	0 37 13.2	0.32	1.297 6202	1.311 2244	1.312 3004
16	307 6 43.0	39.66	9.0	0 37 15.8	0.32	1.297 6421	1.313 3054	1.314 2356
24	307 12 0.3	39.66	9.0	0 37 18.3	0.32	1.297 6640	1.315 0873	1.315 8569
32	307 17 17.5	39.66	+8.9	—0 37 20.8	—0.32	1.297 6858	1.316 5412	1.317 1377
40	307 22 34.8	39.65	+8.9	—0 37 23.4	—0.32	1.297 7075	1.317 6447	1.318 0608

NEPTUNE.

GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	°	'	"			°	'	"			At Date.	At Intermediate Date.
Jan. 6	114	34	5.0	21.75	−26.7	0	29	52.9	+0.65	1.476 8307	1.462 5345	1.462 4041
14	114	36	59.0	21.75	26.6	0	29	47.7	0.65	1.476 8336	1.462 3486	1.462 3680
22	114	39	53.0	21.75	26.6	0	29	42.5	0.65	1.476 8365	1.462 4617	1.462 6291
30	114	42	47.0	21.75	26.5	0	29	37.4	0.65	1.476 8393	1.462 8695	1.463 1814
Feb. 7	114	45	40.9	21.75	26.4	0	29	32.2	0.65	1.476 8421	1.463 5632	1.464 0124
15	114	48	34.9	21.75	−26.3	0	29	27.0	+0.65	1.476 8449	1.464 5260	1.465 1006
23	114	51	28.9	21.75	26.3	0	29	21.8	0.65	1.476 8477	1.465 7329	1.466 4192
Mar. 3	114	54	22.9	21.75	26.2	0	29	16.7	0.65	1.476 8505	1.467 1559	1.467 9391
11	114	57	16.8	21.75	26.1	0	29	11.5	0.65	1.476 8533	1.468 7643	1.469 6266
19	115	0	10.8	21.74	26.0	0	29	6.3	0.65	1.476 8561	1.470 5212	1.471 4432
27	115	3	4.7	21.74	−26.0	0	29	1.1	+0.65	1.476 8590	1.472 3882	1.473 3516
Apr. 4	115	5	58.7	21.74	25.9	0	28	56.0	0.65	1.476 8618	1.474 3286	1.475 3145
12	115	8	52.6	21.74	25.8	0	28	50.8	0.65	1.476 8647	1.476 3042	1.477 2927
20	115	11	46.6	21.74	25.8	0	28	45.6	0.65	1.476 8675	1.478 2756	1.479 2487
28	115	14	40.5	21.74	25.7	0	28	40.4	0.65	1.476 8704	1.480 2080	1.481 1494
May 6	115	17	34.4	21.74	−25.6	0	28	35.2	+0.65	1.476 8732	1.482 0687	1.482 9618
14	115	20	28.4	21.74	25.6	0	28	30.1	0.65	1.476 8761	1.483 8249	1.484 6546
22	115	23	22.3	21.74	25.5	0	28	24.9	0.65	1.476 8790	1.485 4479	1.486 2019
30	115	26	16.2	21.74	25.4	0	28	19.7	0.65	1.476 8819	1.486 9137	1.487 5804
June 7	115	29	10.2	21.74	25.3	0	28	14.5	0.65	1.476 8848	1.488 1994	1.488 7682
15	115	32	4.1	21.74	−25.3	0	28	9.3	+0.65	1.476 8877	1.489 2849	1.489 7479
23	115	34	58.0	21.74	25.2	0	28	4.1	0.65	1.476 8906	1.490 1557	1.490 5069
July 1	115	37	51.9	21.74	25.1	0	27	58.9	0.65	1.476 8936	1.490 8000	1.491 0335
9	115	40	45.9	21.74	25.0	0	27	53.7	0.65	1.476 8965	1.491 2067	1.491 3190
17	115	43	39.8	21.74	25.0	0	27	48.6	0.65	1.476 8994	1.491 3702	1.491 3605
25	115	46	33.7	21.74	−24.9	0	27	43.4	+0.65	1.476 9024	1.491 2898	1.491 1579
Aug. 2	115	49	27.6	21.74	24.8	0	27	38.2	0.65	1.476 9053	1.490 9649	1.490 7114
10	115	52	21.5	21.74	24.8	0	27	33.0	0.65	1.476 9083	1.490 3985	1.490 0277
18	115	55	15.4	21.74	24.7	0	27	27.8	0.65	1.476 9113	1.489 6001	1.489 1171
26	115	58	9.3	21.74	24.6	0	27	22.6	0.65	1.476 9143	1.488 5803	1.487 9913
Sept. 3	116	1	3.2	21.74	−24.5	0	27	17.4	+0.65	1.476 9173	1.487 3522	1.486 6656
11	116	3	57.1	21.74	24.5	0	27	12.2	0.65	1.476 9203	1.485 9344	1.485 1615
19	116	6	51.0	21.74	24.4	0	27	7.0	0.65	1.476 9233	1.484 3497	1.483 5020
27	116	9	44.9	21.74	24.3	0	27	1.8	0.65	1.476 9263	1.482 6216	1.481 7122
Oct. 5	116	12	38.7	21.74	24.3	0	26	56.6	0.65	1.476 9294	1.480 7779	1.479 8229
13	116	15	32.6	21.73	−24.2	0	26	51.4	+0.65	1.476 9324	1.478 8516	1.477 8682
21	116	18	26.5	21.73	24.1	0	26	46.2	0.65	1.476 9354	1.476 8768	1.475 8819
29	116	21	20.4	21.73	24.0	0	26	41.0	0.65	1.476 9385	1.474 8885	1.473 9016
Nov. 6	116	24	14.2	21.73	24.0	0	26	35.8	0.65	1.476 9416	1.472 9263	1.471 9677
14	116	27	8.1	21.73	23.9	0	26	30.6	0.65	1.476 9446	1.471 0304	1.470 1192
22	116	30	2.0	21.73	−23.8	0	26	25.4	+0.65	1.476 9477	1.469 2388	1.468 3940
30	116	32	55.9	21.73	23.7	0	26	20.2	0.65	1.476 9508	1.467 5898	1.466 8311
Dec. 8	116	35	49.7	21.73	23.7	0	26	15.0	0.65	1.476 9539	1.466 1220	1.465 4664
16	116	38	43.6	21.73	23.6	0	26	9.8	0.65	1.476 9570	1.464 8680	1.464 3299
24	116	41	37.4	21.73	23.5	0	26	4.5	0.65	1.476 9601	1.463 8555	1.463 4481
32	116	44	31.3	21.73	−23.4	0	25	59.3	+0.65	1.476 9632	1.463 1102	1.462 8437
40	116	47	25.2	21.73	−23.4	0	25	54.1	+0.65	1.476 9664	1.462 6500	1.462 5300

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.	True Equinox.		True Equinox.	True Equinox.		True Equinox.	True Equinox.	
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Jan. 1	+0.179 2378	+0.187 8326	+ 80	-0.886 8932	-0.885 3963	-145	-0.384 7678	-0.384 1188	+372
2	0.196 4133	0.204 9790	71	0.883 8303	0.882 1953	145	0.383 4398	0.382 7307	371
3	0.213 5289	0.222 0624	61	0.880 4913	0.878 7185	146	0.381 9917	0.381 2228	370
4	0.230 5788	0.239 0774	52	0.876 8769	0.874 9667	146	0.380 4240	0.379 5954	368
5	0.247 5575	0.256 0184	43	0.872 9881	0.870 9412	147	0.378 7372	0.377 8493	366
6	+0.264 4593	+0.272 8796	+ 34	-0.868 8262	-0.866 6433	-148	-0.376 9319	-0.375 9849	+364
7	0.281 2786	0.289 6557	25	0.864 3926	0.862 0744	149	0.375 0085	0.374 0027	362
8	0.298 0101	0.306 3411	16	0.859 6888	0.857 2360	150	0.372 9677	0.371 9035	360
9	0.314 6480	0.322 9302	+ 7	0.854 7162	0.852 1297	152	0.370 8102	0.369 6878	357
10	0.331 1869	0.339 4176	- 1	0.849 4766	0.846 7573	154	0.368 5366	0.367 3567	354
11	+0.347 6216	+0.355 7983	- 10	-0.843 9719	-0.841 1208	-156	-0.366 1481	-0.364 9109	+351
12	0.363 9469	0.372 0668	18	0.838 2042	0.835 2223	158	0.363 6453	0.362 3514	347
13	0.380 1574	0.388 2181	26	0.832 1754	0.829 0638	161	0.361 0292	0.359 6790	344
14	0.396 2482	0.404 2471	34	0.825 8878	0.822 6476	164	0.358 3008	0.356 8948	340
15	0.412 2143	0.420 1491	42	0.819 3436	0.815 9760	167	0.355 4611	0.353 9999	336
16	+0.428 0508	+0.435 9189	- 49	-0.812 5451	-0.809 0513	-170	-0.352 5112	-0.350 9953	+332
17	0.443 7529	0.451 5522	56	0.805 4949	0.801 8762	173	0.349 4522	0.347 8821	328
18	0.459 3161	0.467 0441	63	0.798 1956	0.794 4533	177	0.346 2851	0.344 6614	324
19	0.474 7357	0.482 3903	70	0.790 6496	0.786 7849	181	0.343 0111	0.341 3344	319
20	0.490 0073	0.497 5863	77	0.782 8595	0.778 8736	185	0.339 6314	0.337 9023	314
21	+0.505 1268	+0.512 6282	- 84	-0.774 8277	-0.770 7220	-189	-0.336 1471	-0.334 3660	+309
22	0.520 0899	0.527 5115	90	0.766 5569	0.762 3326	193	0.332 5592	0.330 7268	304
23	0.534 8925	0.542 2323	96	0.758 0495	0.753 7080	197	0.328 8689	0.326 9857	299
24	0.549 5305	0.556 7864	102	0.749 3083	0.744 8506	202	0.325 0772	0.323 1436	294
25	0.563 9996	0.571 1695	108	0.740 3353	0.735 7628	207	0.321 1851	0.319 2017	288
26	+0.578 2956	+0.585 3773	-113	-0.731 1333	-0.726 4471	-212	-0.317 1936	-0.315 1609	+282
27	0.592 4141	0.599 4054	118	0.721 7046	0.716 9062	217	0.313 1038	0.311 0225	276
28	0.606 3508	0.613 2496	122	0.712 0521	0.707 1427	222	0.308 9170	0.306 7874	270
29	0.620 1013	0.626 9052	127	0.702 1783	0.697 1593	227	0.304 6340	0.302 4569	264
30	0.633 6609	0.640 3679	131	0.692 0861	0.686 9590	232	0.300 2562	0.298 0322	257
31	+0.647 0255	+0.653 6332	-135	-0.681 7785	-0.676 5450	-237	-0.295 7850	-0.293 5147	+250
Feb. 1	0.660 1904	0.666 6967	139	0.671 2588	0.665 9204	243	0.291 2215	0.288 9056	243
2	0.673 1515	0.679 5544	142	0.660 5302	0.655 0887	248	0.286 5672	0.284 2065	236
3	0.685 9047	0.692 2020	145	0.649 5962	0.644 0533	253	0.281 8236	0.279 4188	229
4	0.698 4457	0.704 6353	148	0.638 4603	0.632 8178	258	0.276 9923	0.274 5443	222
5	+0.710 7703	+0.716 8502	-150	-0.627 1261	-0.621 3858	-264	-0.272 0749	-0.269 5844	+214
6	0.722 8746	0.728 8430	152	0.615 5973	0.609 7612	269	0.267 0729	0.264 5407	206
7	0.734 7549	0.740 6099	154	0.603 8779	0.597 9479	274	0.261 9881	0.259 4152	198
8	0.746 4074	0.752 1470	156	0.591 9717	0.585 9498	280	0.256 8223	0.254 2095	190
9	0.757 8283	0.763 4510	157	0.579 8828	0.573 7711	285	0.251 5771	0.248 9253	182
10	+0.769 0146	+0.774 5186	-158	-0.567 6152	-0.561 4157	-290	-0.246 2543	-0.243 5644	+174
11	0.779 9627	0.785 3465	158	0.555 1731	0.548 8879	296	0.240 8558	0.238 1288	166
12	0.790 6696	0.795 9315	159	0.542 5607	0.536 1920	301	0.235 3835	0.232 6202	158
13	0.801 1319	0.806 2705	159	0.529 7823	0.523 3322	306	0.229 8392	0.227 0406	149
14	0.811 3470	0.816 3609	159	0.516 8421	0.510 3127	312	0.224 2248	0.221 3919	141
15	+0.821 3120	+0.826 1999	-158	-0.503 7444	-0.497 1379	-317	-0.218 5422	-0.215 6760	+132
16	+0.831 0244	+0.835 7852	-158	-0.490 4936	-0.483 8121	-322	-0.212 7934	-0.209 8947	+123

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.	True Equinox.		True Equinox.	True Equinox.		True Equinox.	True Equinox.	
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Feb. 16	+0.831 0244	+0.835 7852	-158	-0.490 4936	-0.483 8121	-322	-0.212 7934	-0.209 8947	+123
17	0.840 4819	0.845 1143	157	0.477 0939	0.470 3395	327	0.206 9802	0.204 0499	114
18	0.849 6820	0.854 1848	156	0.463 5495	0.456 7243	332	0.201 1043	0.198 1434	105
19	0.858 6224	0.862 9946	154	0.449 8645	0.442 9706	337	0.195 1676	0.192 1770	96
20	0.867 3012	0.871 5418	153	0.436 0432	0.429 0827	342	0.189 1719	0.186 1525	87
21	+0.875 7162	+0.879 8241	-151	-0.422 0896	-0.415 0644	-347	-0.183 1189	-0.180 0714	+ 77
22	0.883 8652	0.887 8393	149	0.408 0075	0.400 9195	352	0.177 0102	0.173 9355	68
23	0.891 7461	0.895 5853	147	0.393 8009	0.386 6522	357	0.170 8475	0.167 7465	58
24	0.899 3566	0.903 0597	144	0.379 4740	0.372 2666	362	0.164 6326	0.161 5060	49
25	0.906 6943	0.910 2602	141	0.365 0306	0.357 7666	366	0.158 3671	0.155 2160	39
26	+0.913 7570	+0.917 1846	-138	-0.350 4750	-0.343 1565	-371	-0.152 0530	-0.148 8782	+ 30
27	0.920 5426	0.923 8307	134	0.335 8116	0.328 4408	375	0.145 6919	0.142 4943	20
28	0.927 0487	0.930 1962	130	0.321 0447	0.313 6238	379	0.139 2857	0.136 0663	11
Mar. 1	0.933 2730	0.936 2790	126	0.306 1788	0.298 7101	383	0.132 8364	0.129 5962	+ 1
2	0.939 2138	0.942 0772	122	0.291 2184	0.283 7043	387	0.126 3460	0.123 0860	- 8
3	+0.944 8691	+0.947 5891	-117	-0.276 1683	-0.268 6111	-391	-0.119 8165	-0.116 5377	- 18
4	0.950 2371	0.952 8128	112	0.261 0332	0.253 4352	395	0.113 2500	0.109 9535	28
5	0.955 3160	0.957 7466	107	0.245 8178	0.238 1817	399	0.106 6486	0.103 3354	38
6	0.960 1044	0.962 3893	102	0.230 5273	0.222 8553	403	0.100 0143	0.096 6855	48
7	0.964 6010	0.966 7394	97	0.215 1662	0.207 4608	407	0.093 3494	0.090 0062	58
8	+0.968 8043	+0.970 7956	- 91	-0.199 7396	-0.192 0033	-410	-0.086 6561	-0.083 2995	- 68
9	0.972 7132	0.974 5570	85	0.184 2524	0.176 4877	413	0.079 9365	0.076 5675	78
10	0.976 3269	0.978 0229	79	0.168 7097	0.160 9191	416	0.073 1927	0.069 8124	88
11	0.979 6451	0.981 1925	73	0.153 1165	0.145 3025	419	0.066 4270	0.063 0366	98
12	0.982 6661	0.984 0650	66	0.137 4778	0.129 6429	422	0.059 6417	0.056 2423	108
13	+0.985 3897	+0.986 6399	- 59	-0.121 7986	-0.113 9453	-425	-0.052 8389	-0.049 4317	-118
14	0.987 8157	0.988 9171	52	0.106 0838	0.098 2147	428	0.046 0209	0.042 6068	128
15	0.989 9440	0.990 8964	45	0.090 3385	0.082 4559	431	0.039 1897	0.035 7698	138
16	0.991 7744	0.992 5780	38	0.074 5675	0.066 6738	434	0.032 3475	0.028 9229	148
17	0.993 3072	0.993 9621	30	0.058 7755	0.050 8732	436	0.025 4964	0.022 0682	157
18	+0.994 5426	+0.995 0487	- 22	-0.042 9675	-0.035 0589	-438	-0.018 6385	-0.015 2076	-167
19	0.995 4805	0.995 8380	14	0.027 1480	0.019 2353	440	0.011 7758	0.008 3432	177
20	0.996 1214	0.996 3308	- 6	-0.011 3214	-0.003 4068	442	-0.004 9101	-0.001 4768	187
21	0.996 4661	0.996 5273	+ 2	+0.004 5078	+0.012 4220	444	+0.001 9566	+0.005 3898	196
22	0.996 5145	0.996 4277	10	0.020 3352	0.028 2470	446	0.008 8225	0.012 2546	206
23	+0.996 2669	+0.996 0322	+ 19	+0.036 1568	+0.044 0639	-448	+0.015 6858	+0.019 1159	-215
24	0.995 7236	0.995 3411	28	0.051 9679	0.059 8682	449	0.022 5446	0.025 9718	224
25	0.994 8848	0.994 3547	37	0.067 7642	0.075 6555	450	0.029 3971	0.032 8205	233
26	0.993 7508	0.993 0731	46	0.083 5415	0.091 4216	451	0.036 2415	0.039 6600	242
27	0.992 3217	0.991 4967	56	0.099 2952	0.107 1618	452	0.043 0757	0.046 4884	251
28	+0.990 5980	+0.989 6256	+ 65	+0.115 0207	+0.122 8714	-453	+0.049 8978	+0.053 3037	-260
29	0.988 5797	0.987 4603	75	0.130 7134	0.138 5461	453	0.056 7059	0.060 1041	269
30	0.986 2675	0.985 0016	85	0.146 3688	0.154 1809	454	0.063 4980	0.066 8874	278
31	0.983 6625	0.982 2503	95	0.161 9818	0.169 7711	454	0.070 2719	0.073 6514	287
Apr. 1	0.980 7651	0.979 2070	105	0.177 5480	0.185 3121	455	0.077 0255	0.080 3941	296
2	+0.977 5761	+0.975 8724	+116	+0.193 0627	+0.200 7990	-455	+0.083 7568	+0.087 1135	-305
3	+0.974 0962	+0.972 2477	+126	+0.208 5207	+0.216 2271	-455	+0.090 4638	+0.093 8075	-314

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Apr. 1	+0.980 7651	+0.979 2070	+105	+0.177 5480	+0.185 3121	-455	+0.077 0255	+0.080 3941	-296
2	0.977 5761	0.975 8724	116	0.193 0627	0.200 7990	455	0.083 7568	0.087 1135	305
3	0.974 0962	0.972 2477	126	0.208 5207	0.216 2271	455	0.090 4638	0.093 8075	314
4	0.970 3270	0.968 3343	137	0.223 9176	0.231 5917	455	0.097 1443	0.100 4740	323
5	0.966 2698	0.964 1335	148	0.239 2487	0.246 8881	455	0.103 7962	0.107 1108	331
6	+0.961 9258	+0.959 6468	+159	+0.254 5092	+0.262 1115	-455	+0.110 4174	+0.113 7159	-339
7	0.957 2967	0.954 8757	170	0.269 6943	0.277 2571	454	0.117 0060	0.120 2873	347
8	0.952 3841	0.949 8220	181	0.284 7992	0.292 3202	454	0.123 5597	0.126 8229	355
9	0.947 1898	0.944 4876	193	0.299 8194	0.307 2964	453	0.130 0766	0.133 3206	363
10	0.941 7158	0.938 8746	205	0.314 7506	0.322 1812	452	0.136 5547	0.139 7786	370
11	+0.935 9644	+0.932 9853	+217	+0.329 5878	+0.336 9698	-451	+0.142 9920	+0.146 1947	-377
12	0.929 9377	0.926 8219	229	0.344 3267	0.351 6580	449	0.149 3864	0.152 5670	384
13	0.923 6382	0.920 3869	240	0.358 9631	0.366 2415	447	0.155 7361	0.158 8937	391
14	0.917 0683	0.913 6827	252	0.373 4928	0.380 7164	445	0.162 0394	0.165 1731	398
15	0.910 2305	0.906 7119	264	0.387 9118	0.395 0785	444	0.168 2945	0.171 4034	405
16	+0.903 1274	+0.899 4772	+277	+0.402 2160	+0.409 3239	-442	+0.174 4997	+0.177 5831	-412
17	0.895 7617	0.891 9812	290	0.416 4018	0.423 4492	441	0.180 6534	0.183 7104	419
18	0.888 1360	0.884 2264	303	0.430 4655	0.437 4504	439	0.186 7540	0.189 7839	425
19	0.880 2527	0.876 2152	316	0.444 4033	0.451 3239	437	0.192 7999	0.195 8020	431
20	0.872 1143	0.867 9502	329	0.458 2117	0.465 0663	434	0.198 7898	0.201 7632	437
21	+0.863 7233	+0.859 4338	+342	+0.471 8872	+0.478 6739	-432	+0.204 7221	+0.207 6661	-443
22	0.855 0821	0.850 6685	355	0.485 4261	0.492 1433	430	0.210 5952	0.213 5091	449
23	0.846 1932	0.841 6565	368	0.498 8250	0.505 4708	427	0.216 4077	0.219 2908	455
24	0.837 0588	0.832 4003	382	0.512 0802	0.518 6528	424	0.222 1581	0.225 0094	460
25	0.827 6814	0.822 9024	395	0.525 1881	0.531 6856	421	0.227 8446	0.230 6635	465
26	+0.818 0636	+0.813 1653	+409	+0.538 1449	+0.544 5655	-418	+0.233 4658	+0.236 2513	-470
27	0.808 2079	0.803 1918	422	0.550 9470	0.557 2888	414	0.239 0199	0.241 7713	475
28	0.798 1173	0.792 9848	436	0.563 5905	0.569 8517	410	0.244 5054	0.247 2219	480
29	0.787 7946	0.782 5471	450	0.576 0718	0.582 2504	406	0.249 9207	0.252 6015	484
30	0.777 2426	0.771 8816	464	0.588 3871	0.594 4814	402	0.255 2641	0.257 9083	488
May 1	+0.766 4645	+0.760 9917	+478	+0.600 5328	+0.606 5409	-397	+0.260 5339	+0.263 1407	-492
2	0.755 4635	0.749 8804	492	0.612 5052	0.618 4254	392	0.265 7286	0.268 2973	496
3	0.744 2428	0.738 5512	506	0.624 3010	0.630 1315	387	0.270 8467	0.273 3765	499
4	0.732 8060	0.727 0076	521	0.635 9165	0.641 6555	382	0.275 8865	0.278 3766	502
5	0.721 1564	0.715 2530	535	0.647 3481	0.652 9939	377	0.280 8465	0.283 2961	505
6	+0.709 2977	+0.703 2911	+550	+0.658 5924	+0.664 1432	-372	+0.285 7251	+0.288 1335	-508
7	0.697 2337	0.691 1259	565	0.669 6459	0.675 1001	366	0.290 5210	0.292 8874	511
8	0.684 9682	0.678 7612	580	0.680 5054	0.685 8615	360	0.295 2325	0.297 5562	513
9	0.672 5053	0.666 2011	595	0.691 1680	0.696 4245	354	0.299 8583	0.302 1387	515
10	0.659 8491	0.653 4498	610	0.701 6306	0.706 7859	348	0.304 3972	0.306 6337	517
11	+0.647 0038	+0.640 5115	+625	+0.711 8902	+0.716 9431	-342	+0.308 8480	+0.311 0400	-519
12	0.633 9734	0.627 3902	640	0.721 9442	0.726 8932	335	0.313 2094	0.315 3562	521
13	0.620 7624	0.614 0904	655	0.731 7899	0.736 6339	328	0.317 4802	0.319 5813	522
14	0.607 3749	0.600 6163	670	0.741 4249	0.746 1628	321	0.321 6594	0.323 7145	523
15	0.593 8151	0.586 9718	685	0.750 8471	0.755 4776	314	0.325 7463	0.327 7548	524
16	+0.580 0869	+0.573 1610	+700	+0.760 0541	+0.764 5762	-306	+0.329 7398	+0.331 7012	-525
17	+0.566 1945	+0.559 1880	+715	+0.769 0438	+0.773 4565	-298	+0.333 6390	+0.335 5530	-525

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
May 17	+0.566 1945	+0.559 1880	+ 715	+0.769 0438	+0.773 4565	-298	+0.333 6390	+0.335 5530	-525
18	0.552 1420	0.545 0569	730	0.777 8142	0.782 1165	290	0.337 4432	0.339 3094	525
19	0.537 9332	0.530 7714	745	0.786 3632	0.790 5541	282	0.341 1515	0.342 9694	525
20	0.523 5720	0.516 3354	760	0.794 6888	0.798 7672	273	0.344 7629	0.346 5320	525
21	0.509 0621	0.501 7527	775	0.802 7889	0.806 7537	264	0.348 2766	0.349 9965	524
22	+0.494 4075	+0.487 0271	+ 790	+0.810 6614	+0.814 5117	-255	+0.351 6917	+0.353 3620	-523
23	0.479 6120	0.472 1627	805	0.818 3044	0.822 0391	245	0.355 0074	0.356 6276	522
24	0.464 6796	0.457 1632	820	0.825 7157	0.829 3337	235	0.358 2227	0.359 7924	521
25	0.449 6141	0.442 0328	835	0.832 8930	0.836 3933	225	0.361 3367	0.362 8554	520
26	0.434 4198	0.426 7756	850	0.839 8343	0.843 2159	215	0.364 3485	0.365 8157	518
27	+0.419 1008	+0.411 3959	+ 865	+0.846 5377	+0.849 7995	-204	+0.367 2571	+0.368 6724	-516
28	0.403 6614	0.395 8979	879	0.853 0011	0.856 1422	193	0.370 0616	0.371 4246	514
29	0.388 1059	0.380 2860	894	0.859 2225	0.862 2419	182	0.372 7613	0.374 0715	512
30	0.372 4387	0.364 5646	908	0.865 2001	0.868 0968	170	0.375 3552	0.376 6122	510
31	0.356 6643	0.348 7383	923	0.870 9319	0.873 7051	158	0.377 8424	0.379 0458	507
June 1	+0.340 7872	+0.332 8116	+ 937	+0.876 4162	+0.879 0650	-146	+0.380 2222	+0.381 3716	-504
2	0.324 8121	0.316 7892	951	0.881 6513	0.884 1750	133	0.382 4939	0.383 5889	500
3	0.308 7436	0.300 6760	965	0.886 6357	0.889 0333	120	0.384 6566	0.385 6968	496
4	0.292 5869	0.284 4769	979	0.891 3675	0.893 6382	107	0.386 7096	0.387 6948	492
5	0.276 3466	0.268 1967	992	0.895 8453	0.897 9886	94	0.388 6523	0.389 5822	488
6	+0.260 0278	+0.251 8406	+1006	+0.900 0680	+0.902 0834	- 80	+0.390 4843	+0.391 3586	-484
7	0.243 6357	0.235 4137	1019	0.904 0346	0.905 9216	66	0.392 2049	0.393 0233	479
8	0.227 1753	0.218 9211	1032	0.907 7442	0.909 5022	52	0.393 8137	0.394 5761	474
9	0.210 6517	0.202 3677	1045	0.911 1956	0.912 8243	38	0.395 3105	0.396 0168	469
10	0.194 0698	0.185 7586	1058	0.914 3883	0.915 8874	23	0.396 6950	0.397 3451	464
11	+0.177 4347	+0.169 0986	+1071	+0.917 3217	+0.918 6912	- 8	+0.397 9670	+0.398 5608	-459
12	0.160 7510	0.152 3925	1083	0.919 9958	0.921 2354	+ 7	0.399 1264	0.399 6638	453
13	0.144 0237	0.135 6451	1095	0.922 4101	0.923 5197	23	0.400 1731	0.400 6541	447
14	0.127 2574	0.118 8611	1107	0.924 5643	0.925 5438	39	0.401 1069	0.401 5315	441
15	0.110 4567	0.102 0448	1119	0.926 4581	0.927 3073	55	0.401 9279	0.402 2961	435
16	+0.093 6261	+0.085 2010	+1130	+0.928 0914	+0.928 8103	+ 72	+0.402 6361	+0.402 9478	-429
17	0.076 7701	0.068 3339	1141	0.929 4641	0.930 0527	89	0.403 2313	0.403 4865	422
18	0.059 8929	0.051 4477	1152	0.930 5761	0.931 0343	106	0.403 7135	0.403 9122	415
19	0.042 9989	0.034 5470	1163	0.931 4272	0.931 7547	123	0.404 0826	0.404 2247	408
20	0.026 0927	0.017 6364	1173	0.932 0169	0.932 2136	140	0.404 3385	0.404 4240	400
21	+0.009 1787	+0.000 7201	+1183	+0.932 3449	+0.932 4109	+158	+0.404 4811	+0.404 5099	-392
22	-0.007 7388	-0.016 1975	1193	0.932 4115	0.932 3466	176	0.404 5103	0.404 4823	384
23	0.024 6553	0.033 1117	1202	0.932 2161	0.932 0201	194	0.404 4259	0.404 3412	376
24	0.041 5660	0.050 0177	1211	0.931 7587	0.931 4318	213	0.404 2281	0.404 0866	368
25	0.058 4663	0.066 9112	1219	0.931 0394	0.930 5815	232	0.403 9167	0.403 7184	359
26	-0.075 3517	-0.083 7873	+1227	+0.930 0580	+0.929 4690	+251	+0.403 4916	+0.403 2364	-350
27	0.092 2174	0.100 6413	1235	0.928 8145	0.928 0946	270	0.402 9528	0.402 6408	341
28	0.109 0584	0.117 4682	1242	0.927 3092	0.926 4584	289	0.402 3004	0.401 9316	332
29	0.125 8701	0.134 2634	1249	0.925 5423	0.924 5608	309	0.401 5344	0.401 1088	323
30	0.142 6476	0.151 0220	1255	0.923 5139	0.922 4017	329	0.400 6548	0.400 1724	314
July 1	-0.159 3861	-0.167 7391	+1261	+0.921 2243	+0.919 9817	+349	+0.399 6617	+0.399 1227	-305
2	-0.176 0804	-0.184 4094	+1267	+0.918 6740	+0.917 3013	+370	+0.398 5554	+0.397 9599	-295

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
July 1	-0.159 3861	-0.167 7391	+1261	+0.921 2243	+0.919 9817	+ 349	+0.399 6617	+0.399 1227	-305
2	0.176 0804	0.184 4094	1267	0.918 6740	0.917 3013	370	0.398 5554	0.397 9599	295
3	0.192 7255	0.201 0280	1272	0.915 8636	0.914 3611	391	0.397 3362	0.396 6844	285
4	0.209 3163	0.217 5898	1277	0.912 7939	0.911 1620	412	0.396 0044	0.395 2963	275
5	0.225 8477	0.234 0895	1281	0.909 4656	0.907 7048	433	0.394 5602	0.393 7961	265
6	-0.242 3145	-0.250 5221	+1285	+0.905 8798	+0.903 9907	+ 454	+0.393 0041	+0.392 1843	-254
7	0.258 7117	0.266 8828	1289	0.902 0378	0.900 0212	475	0.391 3368	0.390 4616	243
8	0.275 0347	0.283 1668	1292	0.897 9412	0.895 7978	496	0.389 5589	0.388 6287	232
9	0.291 2785	0.299 3692	1295	0.893 5913	0.891 3218	517	0.387 6710	0.386 6861	221
10	0.307 4384	0.315 4856	1297	0.888 9896	0.886 5949	539	0.385 6740	0.384 6348	210
11	-0.323 5101	-0.331 5114	+1299	+0.884 1378	+0.881 6186	+ 561	+0.383 5686	+0.382 4754	-199
12	0.339 4891	0.347 4425	1299	0.879 0376	0.876 3950	583	0.381 3554	0.380 2087	188
13	0.355 3712	0.363 2746	1300	0.873 6909	0.870 9256	605	0.379 0354	0.377 8355	176
14	0.371 1521	0.379 0033	1300	0.868 0992	0.865 2120	627	0.376 6092	0.375 3565	164
15	0.386 8277	0.394 6247	1300	0.862 2642	0.859 2560	649	0.374 0776	0.372 7725	152
16	-0.402 3939	-0.410 1348	+1299	+0.856 1875	+0.853 0591	+ 671	+0.371 4413	+0.370 0841	-140
17	0.417 8468	0.425 5295	1297	0.849 8709	0.846 6232	693	0.368 7011	0.367 2923	128
18	0.433 1824	0.440 8049	1295	0.843 3161	0.839 9498	715	0.365 8578	0.364 3976	116
19	0.448 3966	0.455 9569	1292	0.836 5246	0.833 0406	737	0.362 9119	0.361 4007	103
20	0.463 4853	0.470 9813	1289	0.829 4982	0.825 8974	760	0.359 8641	0.358 3022	90
21	-0.478 4444	-0.485 8741	+1285	+0.822 2385	+0.818 5218	+ 782	+0.356 7152	+0.355 1031	- 77
22	0.493 2698	0.500 6311	1281	0.814 7474	0.810 9156	804	0.353 4660	0.351 8040	64
23	0.507 9574	0.515 2482	1276	0.807 0267	0.803 0808	826	0.350 1172	0.348 4056	51
24	0.522 5030	0.529 7213	1270	0.799 0783	0.795 0193	848	0.346 6695	0.344 9089	38
25	0.536 9025	0.544 0462	1264	0.790 9040	0.786 7328	870	0.343 1239	0.341 3146	25
26	-0.551 1517	-0.558 2187	+1258	+0.782 5058	+0.778 2234	+ 892	+0.339 4810	+0.337 6234	- 12
27	0.565 2465	0.572 2346	1251	0.773 8857	0.769 4931	914	0.335 7418	0.333 8364	+ 1
28	0.579 1826	0.586 0898	1244	0.765 0459	0.760 5443	936	0.331 9072	0.329 9544	14
29	0.592 9558	0.599 7800	1236	0.755 9886	0.751 3791	958	0.327 9781	0.325 9784	28
30	0.606 5619	0.613 3009	1228	0.746 7161	0.741 9999	980	0.323 9554	0.321 9092	41
31	-0.619 9964	-0.626 6480	+1219	+0.737 2308	+0.732 4091	+1001	+0.319 8401	+0.317 7482	+ 55
Aug. 1	0.633 2552	0.639 8174	1209	0.727 5353	0.722 6096	1023	0.315 6337	0.313 4966	68
2	0.646 3340	0.652 8045	1199	0.717 6325	0.712 6042	1045	0.311 3371	0.309 1553	82
3	0.659 2284	0.665 6052	1188	0.707 5250	0.702 3956	1066	0.306 9515	0.304 7259	95
4	0.671 9345	0.678 2158	1176	0.697 2162	0.691 9873	1087	0.302 4786	0.300 2098	109
5	-0.684 4485	-0.690 6323	+1164	+0.686 7092	+0.681 3824	+1108	+0.297 9196	+0.295 6083	+122
6	0.696 7666	0.702 8510	1151	0.676 0072	0.670 5841	1128	0.293 2761	0.290 9231	136
7	0.708 8851	0.714 8685	1138	0.665 1136	0.659 5960	1148	0.288 5494	0.286 1553	150
8	0.720 8007	0.726 6814	1124	0.654 0318	0.648 4214	1168	0.283 7410	0.281 3068	164
9	0.732 5102	0.738 2867	1110	0.642 7652	0.637 0637	1188	0.278 8527	0.276 3790	178
10	-0.744 0105	-0.749 6813	+1095	+0.631 3172	+0.625 5262	+1207	+0.273 8858	+0.271 3734	+192
11	0.755 2986	0.760 8621	1079	0.619 6910	0.613 8121	1226	0.268 8419	0.266 2914	206
12	0.766 3715	0.771 8263	1063	0.607 8899	0.601 9248	1245	0.263 7221	0.261 1342	220
13	0.777 2262	0.782 5708	1046	0.595 9172	0.589 8676	1263	0.258 5280	0.255 9036	234
14	0.787 8599	0.793 0930	1029	0.583 7763	0.577 6437	1282	0.253 2611	0.250 6008	248
15	-0.798 2698	-0.803 3900	+1012	+0.571 4703	+0.565 2564	+1301	+0.247 9227	+0.245 2271	+262
16	-0.808 4532	-0.813 4590	+ 994	+0.559 0025	+0.552 7089	+1319	+0.242 5142	+0.239 7841	+276

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc- to Mean Eq'x of Jan. o.	Y		Reduc- to Mean Eq'x of Jan. o.	Z		Reduc- to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Aug. 16	0.808 4532	0.813 4590	+994	+0.559 0025	+0.552 7089	+1319	+0.242 5142	+0.239 7841	+276
17	0.818 4070	0.823 2970	976	0.546 3760	0.540 0044	1337	0.237 0370	0.234 2731	290
18	0.828 1285	0.832 9013	957	0.533 5944	0.527 1463	1354	0.231 4925	0.228 6954	304
19	0.837 6150	0.842 2693	938	0.520 6607	0.514 1380	1371	0.225 8820	0.223 0525	318
20	0.846 8637	0.851 3980	918	0.507 5785	0.500 9826	1388	0.220 2071	0.217 3460	331
21	0.855 8717	0.860 2846	+898	+0.494 3509	+0.487 6837	+1404	+0.214 4693	+0.211 5771	+345
22	0.864 6363	0.868 9264	877	0.480 9815	0.474 2447	1420	0.208 6697	0.205 7473	359
23	0.873 1547	0.877 3207	856	0.467 4738	0.460 6692	1436	0.202 8101	0.199 8582	373
24	0.881 4241	0.885 4646	834	0.453 8314	0.446 9608	1450	0.196 8919	0.193 9113	387
25	0.889 4419	0.893 3556	812	0.440 0578	0.433 1230	1465	0.190 9166	0.187 9080	401
26	0.897 2053	0.900 9907	+789	+0.426 1567	+0.419 1595	+1480	+0.184 8858	+0.181 8501	+414
27	0.904 7115	0.908 3673	766	0.412 1318	0.405 0742	1495	0.178 8012	0.175 7392	427
28	0.911 9577	0.915 4825	742	0.397 9871	0.390 8710	1509	0.172 6644	0.169 5770	440
29	0.918 9413	0.922 3338	718	0.383 7265	0.376 5541	1522	0.166 4772	0.163 3653	453
30	0.925 6597	0.928 9187	693	0.369 3543	0.362 1277	1534	0.160 2415	0.157 1060	466
31	0.932 1105	0.935 2347	+668	+0.354 8748	+0.347 5961	+1546	+0.153 9591	+0.150 8010	+479
Sept. 1	0.938 2912	0.941 2796	643	0.340 2923	0.332 9637	1558	0.147 6319	0.144 4522	492
2	0.944 1998	0.947 0514	617	0.325 6111	0.318 2350	1570	0.141 2620	0.138 0617	505
3	0.949 8343	0.952 5482	591	0.310 8360	0.303 4149	1581	0.134 8515	0.131 6316	518
4	0.955 1929	0.957 7682	565	0.295 9722	0.288 5084	1592	0.128 4023	0.125 1638	531
5	0.960 2741	0.962 7103	+538	+0.281 0240	+0.273 5196	+1603	+0.121 9164	+0.118 6604	+543
6	0.965 0767	0.967 3730	511	0.265 9957	0.258 4528	1613	0.115 3960	0.112 1234	556
7	0.969 5991	0.971 7550	483	0.250 8915	0.243 3124	1622	0.108 8429	0.105 5547	568
8	0.973 8405	0.975 8555	455	0.235 7160	0.228 1030	1631	0.102 2591	0.098 9562	580
9	0.977 7998	0.979 6733	427	0.220 4738	0.212 8289	1639	0.095 6464	0.092 3298	592
10	0.981 4759	0.983 2074	+399	+0.205 1690	+0.197 4945	+1647	+0.089 0068	+0.085 6775	+604
11	0.984 8678	0.986 4569	370	0.189 8060	0.182 1040	1655	0.082 3421	0.079 0008	616
12	0.987 9746	0.989 4208	341	0.174 3890	0.166 6616	1662	0.075 6541	0.072 3019	627
13	0.990 7954	0.992 0983	312	0.158 9223	0.151 1716	1668	0.068 9446	0.065 5824	638
14	0.993 3294	0.994 4886	282	0.143 4100	0.135 6381	1674	0.062 2154	0.058 8440	649
15	0.995 5757	0.996 5906	+252	+0.127 8565	+0.120 0656	+1679	+0.055 4683	+0.052 0886	+660
16	0.997 5333	0.998 4037	222	0.112 2659	0.104 4580	1684	0.048 7051	0.045 3180	671
17	0.999 2016	0.999 9270	192	0.096 6424	0.088 8198	1689	0.041 9276	0.038 5341	682
18	1.000 5798	1.001 1599	161	0.080 9905	0.073 1551	1693	0.035 1378	0.031 7388	692
19	1.001 6672	1.002 1016	130	0.065 3142	0.057 4683	1697	0.028 3374	0.024 9338	702
20	1.002 4631	1.002 7515	+ 99	+0.049 6180	+0.041 7638	+1700	+0.021 5282	+0.018 1209	+712
21	1.002 9667	1.003 1088	68	0.033 9063	0.026 0460	1703	0.014 7121	0.011 3021	722
22	1.003 1776	1.003 1728	37	0.018 1834	+0.010 3192	1705	0.007 8910	+0.004 4792	732
23	1.003 0946	1.002 9430	+ 5	+0.002 4538	-0.005 4121	1706	+0.001 0668	-0.002 3458	741
24	1.002 7178	1.002 4189	- 27	-0.013 2779	0.021 1432	1707	-0.005 7585	0.009 1709	750
25	1.002 0463	1.001 5999	- 59	-0.029 0072	-0.036 8694	+1708	-0.012 5829	-0.015 9942	+759
26	1.001 0797	1.000 4856	91	0.044 7293	0.052 5862	1708	0.019 4044	0.022 8133	768
27	0.999 8175	0.999 0755	124	0.060 4396	0.068 2887	1707	0.026 2207	0.029 6263	776
28	0.998 2597	0.997 3700	156	0.076 1329	0.083 9717	1707	0.033 0298	0.036 4309	784
29	0.996 4065	0.995 3691	189	0.091 8044	0.099 6303	1706	0.039 8294	0.043 2249	792
30	0.994 2578	0.993 0728	-222	-0.107 4489	-0.115 2594	+1704	-0.046 6173	-0.050 0062	+799
t. 1	0.991 8140	0.990 4816	-255	-0.123 0613	-0.130 8540	+1701	-0.053 3914	-0.056 7725	+806

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Oct. 1	-0.991 8140	-0.990 4816	- 255	-0.123 0613	-0.130 8540	+1701	-0.053 3914	-0.056 7725	+806
2	0.989 0757	0.987 5964	288	0.138 6369	0.146 4093	1698	0.060 1493	0.063 5215	813
3	0.986 0438	0.984 4181	321	0.154 1705	0.161 9200	1695	0.066 8889	0.070 2511	820
4	0.982 7193	0.980 9477	354	0.169 6572	0.177 3814	1691	0.073 6080	0.076 9592	827
5	0.979 1033	0.977 1863	387	0.185 0922	0.192 7889	1687	0.080 3045	0.083 6436	834
6	-0.975 1970	-0.973 1354	- 420	-0.200 4710	-0.208 1378	+1682	-0.086 9764	-0.090 3025	+841
7	0.971 0017	0.968 7962	454	0.215 7889	0.223 4236	1676	0.093 6218	0.096 9339	847
8	0.966 5189	0.964 1701	488	0.231 0414	0.238 6418	1670	0.100 2386	0.103 5357	853
9	0.961 7499	0.959 2585	522	0.246 2242	0.253 7880	1663	0.106 8250	0.110 1062	858
10	0.956 6960	0.954 0627	556	0.261 3328	0.268 8579	1656	0.113 3791	0.116 6435	863
11	-0.951 3587	-0.948 5842	- 589	-0.276 3629	-0.283 8472	+1649	-0.119 8992	-0.123 1458	+868
12	0.945 7394	0.942 8245	623	0.291 3102	0.298 7515	1641	0.126 3832	0.129 6111	873
13	0.939 8397	0.936 7852	656	0.306 1704	0.313 5665	1632	0.132 8293	0.136 0377	877
14	0.933 6611	0.930 4677	690	0.320 9393	0.328 2882	1623	0.139 2360	0.142 4240	881
15	0.927 2052	0.923 8737	723	0.335 6126	0.342 9122	1614	0.145 6014	0.148 7680	885
16	-0.920 4735	-0.917 0048	- 757	-0.350 1863	-0.357 4344	+1604	-0.151 9235	-0.155 0677	+888
17	0.913 4678	0.909 8627	790	0.364 6560	0.371 8506	1593	0.158 2005	0.161 3216	891
18	0.906 1897	0.902 4490	824	0.379 0176	0.386 1565	1582	0.164 4307	0.167 5277	894
19	0.898 6409	0.894 7655	857	0.393 2667	0.400 3478	1571	0.170 6124	0.173 6845	897
20	0.890 8231	0.886 8138	891	0.407 3993	0.414 4206	1559	0.176 7437	0.179 7899	899
21	-0.882 7380	-0.878 5958	- 924	-0.421 4112	-0.428 3705	+1547	-0.182 8227	-0.185 8420	+901
22	0.874 3876	0.870 1135	958	0.435 2980	0.442 1931	1534	0.188 8475	0.191 8391	902
23	0.865 7738	0.861 3687	991	0.449 0552	0.455 8839	1521	0.194 8164	0.197 7792	903
24	0.856 8984	0.852 3633	1025	0.462 6786	0.469 4387	1507	0.200 7273	0.203 6604	903
25	0.847 7636	0.843 0997	1058	0.476 1637	0.482 8530	1492	0.206 5782	0.209 4806	903
26	-0.838 3719	-0.833 5805	-1091	-0.489 5060	-0.496 1222	+1477	-0.212 3672	-0.215 2379	+904
27	0.828 7257	0.823 8079	1124	0.502 7011	0.509 2420	1461	0.218 0924	0.220 9305	904
28	0.818 8274	0.813 7847	1157	0.515 7443	0.522 2076	1445	0.223 7518	0.226 5561	903
29	0.808 6801	0.803 5140	1190	0.528 6312	0.535 0147	1428	0.229 3432	0.232 1128	902
30	0.798 2869	0.792 9991	1223	0.541 3575	0.547 6591	1411	0.234 8647	0.237 5987	901
31	-0.787 6510	-0.782 2431	-1255	-0.553 9189	-0.560 1364	+1394	-0.240 3145	-0.243 0120	+899
Nov. 1	0.776 7759	0.771 2496	1288	0.566 3111	0.572 4426	1376	0.245 6909	0.248 3510	897
2	0.765 6649	0.760 0221	1320	0.578 5304	0.584 5740	1358	0.250 9920	0.253 6138	895
3	0.754 3218	0.748 5643	1352	0.590 5728	0.596 5265	1339	0.256 2162	0.258 7990	892
4	0.742 7501	0.736 8797	1384	0.602 4345	0.608 2965	1320	0.261 3620	0.263 9049	889
5	-0.730 9536	-0.724 9723	-1416	-0.614 1120	-0.619 8806	+1300	-0.266 4276	-0.268 9300	+886
6	0.718 9361	0.712 8456	1447	0.625 6018	0.631 2753	1280	0.271 4118	0.273 8728	882
7	0.706 7011	0.700 5032	1478	0.636 9006	0.642 4773	1259	0.276 3129	0.278 7319	878
8	0.694 2523	0.687 9488	1509	0.648 0049	0.653 4831	1238	0.281 1296	0.283 5059	874
9	0.681 5933	0.675 1862	1540	0.658 9115	0.664 2896	1215	0.285 8605	0.288 1934	869
10	-0.668 7280	-0.662 2192	-1571	-0.669 6171	-0.674 8936	+1192	-0.290 5043	-0.292 7932	+864
11	0.655 6603	0.649 0517	1601	0.680 1187	0.685 2920	1168	0.295 0597	0.297 3037	859
12	0.642 3939	0.635 6873	1631	0.690 4132	0.695 4819	1144	0.299 5251	0.301 7237	853
13	0.628 9325	0.622 1298	1661	0.700 4976	0.705 4600	1120	0.303 8994	0.306 0521	847
14	0.615 2798	0.608 3830	1690	0.710 3688	0.715 2235	1096	0.308 1815	0.310 2875	841
15	-0.601 4398	-0.594 4508	-1719	-0.720 0238	-0.724 7694	+1072	-0.312 3699	-0.314 4286	+835
16	-0.587 4163	-0.580 3369	-1748	-0.729 4598	-0.734 0947	+1048	-0.316 4634	-0.318 4742	+828

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. o.	Y		Reduc. to Mean Eq'x of Jan. o.	Z		Reduc. to Mean Eq'x of Jan. o.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Nov. 16	0.587 4163	0.580 3369	-1748	0.729 4598	0.734 0947	+1048	0.316 4634	0.318 4742	+828
17	0.573 2130	0.566 0451	1777	0.738 6737	0.743 1965	1023	0.320 4608	0.322 4230	820
18	0.558 8337	0.551 5793	1805	0.747 6627	0.752 0719	997	0.324 3607	0.326 2737	812
19	0.544 2825	0.536 9436	1833	0.756 4237	0.760 7179	970	0.328 1619	0.330 0250	804
20	0.529 5633	0.522 1420	1861	0.764 9540	0.769 1316	943	0.331 8630	0.333 6756	796
21	0.514 6803	0.507 1786	-1888	0.773 2504	0.777 3100	+ 915	0.335 4628	0.337 2243	+787
22	0.499 6376	0.492 0577	1915	0.781 3100	0.785 2501	887	0.338 9600	0.340 6696	778
23	0.484 4396	0.476 7838	1942	0.789 1298	0.792 9488	858	0.342 3531	0.344 0102	769
24	0.469 0909	0.461 3614	1968	0.796 7068	0.800 4034	829	0.345 6409	0.347 2449	759
25	0.453 5960	0.445 7953	1993	0.804 0383	0.807 6112	799	0.348 8221	0.350 3724	749
26	0.437 9599	0.430 0905	-2018	0.811 1217	0.814 5695	+ 769	0.351 8956	0.353 3915	+739
27	0.422 1876	0.414 2519	2043	0.817 9542	0.821 2755	739	0.354 8600	0.356 3010	728
28	0.406 2841	0.398 2848	2068	0.824 5331	0.827 7268	708	0.357 7143	0.359 0998	717
29	0.390 2548	0.382 1945	2092	0.830 8563	0.833 9213	676	0.360 4575	0.361 7871	706
30	0.374 1048	0.365 9863	2116	0.836 9216	0.839 8569	644	0.363 0886	0.364 3619	694
Dec. 1	0.357 8396	0.349 6655	-2139	0.842 7271	0.845 5319	+ 612	0.365 6069	0.366 8235	+682
2	0.341 4646	0.333 2376	2162	0.848 2710	0.850 9442	579	0.368 0116	0.369 1711	670
3	0.324 9850	0.316 7075	2184	0.853 5515	0.856 0927	546	0.370 3019	0.371 4040	657
4	0.308 4058	0.300 0807	2205	0.858 5675	0.860 9758	512	0.372 4773	0.373 5218	644
5	0.291 7327	0.283 3625	2226	0.863 3173	0.865 5918	478	0.374 5373	0.375 5237	631
6	0.274 9707	0.266 5580	-2246	0.867 7992	0.869 9394	+ 444	0.376 4810	0.377 4092	+618
7	0.258 1250	0.249 6724	2265	0.872 0123	0.874 0178	409	0.378 3081	0.379 1778	604
8	0.241 2008	0.232 7109	2285	0.875 9556	0.877 8257	373	0.380 0182	0.380 8292	590
9	0.224 2033	0.215 6789	2303	0.879 6279	0.881 3621	337	0.381 6107	0.382 3628	576
10	0.207 1378	0.198 5811	2321	0.883 0282	0.884 6261	301	0.383 0853	0.383 7783	561
11	0.190 0092	0.181 4228	-2339	0.886 1556	0.887 6167	+ 264	0.384 4417	0.385 0754	+546
12	0.172 8225	0.164 2089	2356	0.889 0092	0.890 3331	227	0.385 6794	0.386 2537	531
13	0.155 5827	0.146 9445	2371	0.891 5882	0.892 7745	190	0.386 7982	0.387 3129	516
14	0.138 2950	0.129 6347	2386	0.893 8919	0.894 9403	152	0.387 7977	0.388 2526	500
15	0.120 9643	0.112 2844	2401	0.895 9196	0.896 8298	114	0.388 6776	0.389 0726	484
16	0.103 5956	0.094 8985	-2416	0.897 6707	0.898 4422	+ 76	0.389 4375	0.389 7723	+468
17	0.086 1938	0.077 4821	2430	0.899 1441	0.899 7764	+ 37	0.390 0771	0.390 3517	452
18	0.068 7640	0.060 0402	2443	0.900 3391	0.900 8321	- 3	0.390 5962	0.390 8104	435
19	0.051 3114	0.042 5781	2454	0.901 2553	0.901 6085	42	0.390 9944	0.391 1480	418
20	0.033 8411	0.025 1011	2465	0.901 8917	0.902 1048	82	0.391 2712	0.391 3640	401
21	0.016 3587	0.007 6145	-2475	0.902 2478	0.902 3207	- 122	0.391 4264	0.391 4583	+385
22	+0.001 1307	+0.009 8761	2484	0.902 3233	0.902 2556	162	0.391 4597	0.391 4306	367
23	0.018 6211	0.027 3651	2493	0.902 1175	0.901 9090	203	0.391 3709	0.391 2806	349
24	0.036 1073	0.044 8469	2502	0.901 6301	0.901 2808	244	0.391 1597	0.391 0083	331
25	0.053 5832	0.062 3156	2510	0.900 8610	0.900 3708	285	0.390 8263	0.390 6137	312
26	+0.071 0432	+0.079 7654	-2518	0.899 8103	0.899 1794	- 326	0.390 3705	0.390 0968	+293
27	0.088 4814	0.097 1905	2524	0.898 4782	0.897 7067	368	0.389 7925	0.389 4577	275
28	0.105 8920	0.114 5851	2529	0.896 8649	0.895 9530	410	0.389 0924	0.388 6966	256
29	0.123 2691	0.131 9433	2533	0.894 9710	0.893 9191	452	0.388 2704	0.387 8138	237
30	0.140 6071	0.149 2597	2536	0.892 7974	0.891 6060	494	0.387 3269	0.386 8097	218
31	+0.157 9004	+0.166 5285	-2538	0.890 3449	0.889 0144	- 536	0.386 2623	0.385 6848	+199
32	+0.175 1433	+0.183 7440	-2540	0.887 6145	0.886 1454	- 579	0.385 0772	0.384 4396	+179

208 MOON'S LONGITUDE AND LATITUDE, 1913.
FOR GREENWICH AND
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210 MOON'S LONGITUDE AND LATITUDE, 1913.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
1.0	63 59 21.2	+4 36 20.8	1.0	114 14 16.6	+4 29 15.1	1.0	167 31 20.5	+0 36 27.0
1.5	70 42 45.9	4 48 33.9	1.5	121 35 16.6	4 7 50.0	1.5	175 6 1.4	-0 5 27.3
2.0	77 32 14.5	4 56 52.0	2.0	128 59 52.7	3 42 3.7	2.0	182 38 49.4	0 47 6.6
2.5	84 27 31.6	5 0 57.1	2.5	136 27 3.6	3 12 20.1	2.5	190 8 40.9	1 27 41.6
3.0	91 28 12.8	5 0 34.7	3.0	143 55 44.8	2 39 10.2	3.0	197 34 39.4	2 6 26.3
3.5	98 33 44.8	+4 55 35.4	3.5	151 24 50.0	+2 3 11.4	3.5	204 55 57.4	-2 42 40.3
4.0	105 43 26.7	4 45 55.2	4.0	158 53 15.9	1 25 6.0	4.0	212 11 57.2	3 15 49.7
4.5	112 56 32.5	4 31 36.7	4.5	166 20 3.6	0 45 39.0	4.5	219 22 10.7	3 45 26.9
5.0	120 12 11.6	4 12 49.2	5.0	173 44 20.3	+0 5 36.5	5.0	226 26 19.6	4 11 11.4
5.5	127 29 31.7	3 49 48.9	5.5	181 5 21.2	-0 34 16.2	5.5	233 24 15.0	4 32 48.9
6.0	134 47 40.6	+3 22 58.5	6.0	188 22 30.1	-1 13 16.0	6.0	240 15 56.0	-4 50 11.1
6.5	142 5 49.0	2 52 46.2	6.5	195 35 19.2	1 50 43.2	6.5	247 1 28.4	5 3 14.7
7.0	149 23 11.6	2 19 44.9	7.0	202 43 28.9	2 26 2.7	7.0	253 41 4.1	5 12 0.4
7.5	156 39 8.6	1 44 31.2	7.5	209 46 47.2	2 58 44.3	7.5	260 14 59.3	5 16 32.7
8.0	163 53 6.8	1 7 43.4	8.0	216 45 9.4	3 28 22.9	8.0	266 43 33.8	5 16 58.5
8.5	171 4 39.9	+0 30 0.7	8.5	223 38 35.8	-3 54 38.1	8.5	273 7 10.1	-5 13 27.1
9.0	178 13 28.0	-0 7 57.8	9.0	230 27 11.6	4 17 14.3	9.0	279 26 12.1	5 6 9.3
9.5	185 19 17.6	0 45 34.1	9.5	237 11 5.1	4 36 0.6	9.5	285 41 4.5	4 55 17.6
10.0	192 22 0.2	1 22 12.6	10.0	243 50 27.0	4 50 49.6	10.0	291 52 12.2	4 41 5.4
10.5	199 21 31.6	1 57 20.5	10.5	250 25 29.5	5 1 37.4	10.5	298 0 0.0	4 23 47.0
11.0	206 17 51.0	-2 30 27.5	11.0	256 56 25.8	-5 8 23.6	11.0	304 4 51.7	-4 3 37.5
11.5	213 10 59.8	3 1 6.7	11.5	263 23 29.5	5 11 10.4	11.5	310 7 10.7	3 40 52.5
12.0	220 1 0.1	3 28 54.7	12.0	269 46 53.7	5 10 2.4	12.0	316 7 19.0	3 15 48.8
12.5	226 47 54.8	3 53 32.0	12.5	276 6 51.2	5 5 6.7	12.5	322 5 37.7	2 48 43.5
13.0	233 31 46.6	4 14 42.3	13.0	282 23 34.4	4 56 32.3	13.0	328 2 26.6	2 19 54.5
13.5	240 12 37.2	-4 32 12.7	13.5	288 37 15.1	-4 44 30.1	13.5	333 58 4.4	-1 49 39.9
14.0	246 50 27.1	4 45 53.9	14.0	294 48 4.3	4 29 12.8	14.0	339 52 49.3	1 18 18.3
14.5	253 25 16.1	4 55 40.3	14.5	300 56 13.1	4 10 54.3	14.5	345 46 58.7	0 46 9.0
15.0	259 57 3.2	5 1 29.5	15.0	307 1 52.3	3 49 50.1	15.0	351 40 49.6	-0 13 31.5
15.5	266 25 46.2	5 3 22.3	15.5	313 5 13.0	3 26 16.8	15.5	357 34 38.8	+0 19 14.7
16.0	272 51 22.9	-5 1 22.5	16.0	319 6 26.6	-3 0 31.8	16.0	3 28 43.0	+0 51 50.1
16.5	279 13 51.1	4 55 37.2	16.5	325 5 45.2	2 32 53.3	16.5	9 23 19.3	1 23 54.9
17.0	285 33 9.3	4 46 15.8	17.0	331 3 22.1	2 3 39.9	17.0	15 18 45.1	1 55 9.6
17.5	291 49 17.7	4 33 30.1	17.5	336 59 32.2	1 33 10.9	17.5	21 15 18.8	2 25 15.0
18.0	298 2 18.2	4 17 33.8	18.0	342 54 31.5	1 1 45.5	18.0	27 13 19.5	2 53 52.3
18.5	304 12 14.2	-3 58 42.3	18.5	348 48 37.7	-0 29 43.0	18.5	33 13 7.3	+3 20 43.0
19.0	310 19 12.6	3 37 12.5	19.0	354 42 11.0	+0 2 37.6	19.0	39 15 3.4	3 45 29.2
19.5	316 23 22.9	3 13 21.9	19.5	0 35 33.1	0 34 57.1	19.5	45 19 30.2	4 7 53.3
20.0	322 24 57.7	2 47 28.8	20.0	6 29 7.9	1 6 56.8	20.0	51 26 51.5	4 27 38.4
20.5	328 24 13.0	2 19 51.6	20.5	12 23 21.3	1 38 18.1	20.5	57 37 31.6	4 44 28.1
21.0	334 21 28.0	-1 50 48.9	21.0	18 18 41.4	+2 8 42.8	21.0	63 51 55.5	+4 58 6.9
21.5	340 17 5.0	1 20 39.4	21.5	24 15 38.0	2 37 52.8	21.5	70 10 28.6	5 8 19.9
22.0	346 11 29.6	0 49 41.4	22.0	30 14 42.6	3 5 30.1	22.0	76 33 36.2	5 14 52.8
22.5	352 5 10.6	-0 18 12.9	22.5	36 16 28.2	3 31 16.8	22.5	83 1 42.7	5 17 32.8
23.0	357 58 39.2	+0 13 28.1	23.0	42 21 28.7	3 54 54.9	23.0	89 35 10.8	5 16 8.9
23.5	3 52 28.9	+0 45 4.1	23.5	48 30 18.4	+4 16 6.3	23.5	96 14 20.6	+5 10 31.6
24.0	9 47 15.7	1 16 17.4	24.0	54 43 31.3	4 34 32.8	24.0	102 59 29.0	5 0 33.9
24.5	15 43 37.3	1 46 50.4	24.5	61 1 40.7	4 49 56.4	24.5	109 50 48.2	4 46 12.2
25.0	21 42 12.3	2 16 25.1	25.0	67 25 18.5	5 1 58.8	25.0	116 48 24.4	4 27 26.7
25.5	27 43 40.0	2 44 43.4	25.5	73 54 52.9	5 10 22.3	25.5	123 52 16.5	4 4 22.5
26.0	33 48 39.8	+3 11 26.8	26.0	80 30 48.4	+5 14 50.2	26.0	131 2 15.5	+3 37 10.5
26.5	39 57 50.5	3 36 15.8	26.5	87 13 24.4	5 15 6.9	26.5	138 18 3.5	3 6 7.9
27.0	46 11 49.0	3 58 50.4	27.0	94 2 53.3	5 10 59.0	27.0	145 39 12.5	2 31 38.8
27.5	52 31 9.8	4 18 50.0	27.5	100 59 20.1	5 2 16.3	27.5	153 5 4.2	1 54 14.4
28.0	58 56 23.7	4 35 53.7	28.0	108 2 40.1	4 48 52.7	28.0	160 34 50.9	1 14 32.8
28.5	65 27 56.2	+4 49 40.4	28.5	115 12 38.1	+4 30 47.5	28.5	168 7 36.6	+0 33 17.8
29.0	72 6 6.5	4 59 49.1	29.0	122 28 48.8	4 8 6.2	29.0	175 42 17.6	-0 8 42.2
29.5	78 51 6.3	5 6 0.1	29.5	129 50 35.8	3 41 1.8	29.5	183 17 44.4	0 50 36.4
30.0	85 42 58.9	5 7 55.8	30.0	137 17 11.9	3 9 55.0	30.0	190 52 45.3	1 31 33.3
30.5	92 41 37.2	5 5 21.1	30.5	144 47 40.6	2 35 14.6	30.5	198 26 8.8	2 10 43.7
31.0	99 46 43.5	+4 58 5.3	31.0	152 20 58.2	+1 57 37.1	31.0	205 56 45.4	-2 47 22.1
31.5	106 57 49.5	+4 46 3.0	31.5	159 55 55.5	+1 17 45.3	31.5	213 23 30.9	-3 20 49.0

MOON'S LONGITUDE AND LATITUDE, 1913. 211

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		Day of Month.	NOVEMBER.		Day of Month.	DECEMBER.	
	True Long.	Latitude.		True Long.	Latitude.		True Long.	Latitude.
	° ' "	° ' "		° ' "	° ' "		° ' "	° ' "
1.0	205 56 45.4	-2 47 22.1	1.0	257 23 22.4	-5 7 9.3	1.0	292 6 34.2	-4 17 10.0
1.5	213 23 30.9	3 20 49.0	1.5	264 16 20.3	5 8 37.8	1.5	298 33 25.2	3 57 47.7
2.0	220 45 29.3	3 50 32.1	2.0	271 2 25.0	5 5 43.8	2.0	304 54 29.2	3 35 43.2
2.5	228 1 53.9	4 16 6.9	2.5	277 41 37.2	4 58 43.0	2.5	311 10 7.8	3 11 18.9
3.0	235 12 7.5	4 37 16.7	3.0	284 14 6.9	4 47 53.1	3.0	317 20 48.5	2 44 56.6
3.5	242 15 44.0	-4 53 52.1	3.5	290 40 12.0	-4 33 33.5	3.5	323 27 3.9	-2 16 57.6
4.0	249 12 28.7	5 5 50.5	4.0	297 0 17.4	4 16 4.3	4.0	329 29 30.1	1 47 42.0
4.5	256 2 16.8	5 13 14.8	4.5	303 14 53.1	3 55 45.6	4.5	335 28 46.2	1 17 29.1
5.0	262 45 12.5	5 16 12.3	5.0	309 24 33.1	3 32 57.3	5.0	341 25 33.2	0 46 37.2
5.5	269 21 28.0	5 14 54.0	5.5	315 29 54.6	3 7 58.8	5.5	347 20 33.4	-0 15 24.2
6.0	275 51 22.2	-5 9 33.3	6.0	321 31 36.8	-2 41 9.1	6.0	353 14 29.3	+0 15 52.8
6.5	282 15 19.4	5 0 25.1	6.5	327 30 19.5	2 12 46.3	6.5	359 8 3.1	0 46 57.0
7.0	288 33 48.0	4 47 45.6	7.0	333 26 42.9	1 43 8.5	7.0	5 1 56.1	1 17 31.5
7.5	294 47 19.0	4 31 51.5	7.5	339 21 26.9	1 12 33.2	7.5	10 56 48.4	1 47 19.5
8.0	300 56 25.7	4 12 59.9	8.0	345 15 10.1	0 41 17.6	8.0	16 53 17.6	2 16 3.8
8.5	307 1 42.2	-3 51 27.9	8.5	351 8 29.5	-0 9 39.2	8.5	22 51 58.9	+2 43 27.0
9.0	313 3 42.7	3 27 32.7	9.0	357 2 0.0	+0 22 4.5	9.0	28 53 23.9	3 9 11.3
9.5	319 3 1.1	3 1 31.5	9.5	2 56 14.3	0 53 35.6	9.5	34 58 0.6	3 32 58.4
10.0	325 0 10.4	2 33 41.5	10.0	8 51 42.0	1 24 35.9	10.0	41 6 12.9	3 54 29.9
10.5	330 55 42.0	2 4 20.2	10.5	14 48 49.9	1 54 46.8	10.5	47 18 19.8	4 13 27.4
11.0	336 50 5.9	-1 33 45.2	11.0	20 48 1.4	+2 23 49.3	11.0	53 34 35.1	+4 29 32.7
11.5	342 43 50.1	1 2 14.6	11.5	26 49 36.3	2 51 24.3	11.5	59 55 7.3	4 42 28.6
12.0	348 37 20.6	-0 30 6.5	12.0	32 53 51.1	3 17 12.2	12.0	66 19 59.3	4 51 58.9
12.5	354 31 1.1	+0 2 20.5	12.5	39 0 59.0	3 40 53.6	12.5	72 49 8.8	4 57 49.3
13.0	0 25 13.6	0 34 47.3	13.0	45 11 9.2	4 2 9.7	13.0	79 22 27.9	4 59 48.0
13.5	6 20 17.9	+1 6 54.5	13.5	51 24 27.8	+4 20 42.2	13.5	85 59 44.4	+4 57 46.1
14.0	12 16 31.6	1 38 22.4	14.0	57 40 58.0	4 36 14.0	14.0	92 40 42.1	4 51 38.5
14.5	18 14 10.6	2 8 51.4	14.5	64 0 40.3	4 48 29.3	14.5	99 25 1.8	4 41 23.9
15.0	24 13 29.5	2 38 1.7	15.0	70 23 32.9	4 57 14.1	15.0	106 12 22.5	4 27 5.4
15.5	30 14 41.5	3 5 33.7	15.5	76 49 32.8	5 2 17.0	15.5	113 2 21.8	4 8 50.8
16.0	36 17 58.4	+3 31 8.3	16.0	83 18 35.9	+5 3 29.1	16.0	119 54 38.0	+3 46 52.5
16.5	42 23 31.2	3 54 26.9	16.5	89 50 37.3	5 0 44.1	16.5	126 48 50.7	3 21 27.0
17.0	48 31 30.5	4 15 11.7	17.0	96 25 32.7	4 53 59.0	17.0	133 44 41.2	2 52 55.0
17.5	54 42 6.8	4 33 5.9	17.5	103 3 18.5	4 43 14.1	17.5	140 41 53.5	2 21 40.9
18.0	60 55 30.6	4 47 54.0	18.0	109 43 52.1	4 28 33.1	18.0	147 40 14.5	1 48 12.4
18.5	67 11 52.6	+4 59 21.8	18.5	116 27 12.7	+4 10 3.2	18.5	154 39 34.2	+1 12 59.7
19.0	73 31 24.1	5 7 16.8	19.0	123 13 20.6	3 47 55.0	19.0	161 39 45.3	+0 36 34.9
19.5	79 54 17.0	5 11 28.1	19.5	130 2 17.1	3 22 22.8	19.5	168 40 42.3	-0 0 28.4
20.0	86 20 43.9	5 11 46.8	20.0	136 54 4.8	2 53 44.3	20.0	175 42 21.2	0 37 35.6
20.5	92 50 57.9	5 8 6.2	20.5	143 48 46.8	2 22 20.7	20.5	182 44 38.1	1 14 11.9
21.0	99 25 12.4	+5 0 22.0	21.0	150 46 25.7	+1 48 36.7	21.0	189 47 28.9	-1 49 42.6
21.5	106 3 40.6	4 48 32.4	21.5	157 47 2.2	1 13 0.2	21.5	196 50 47.8	2 23 33.9
22.0	112 46 35.0	4 32 38.8	22.0	164 50 34.8	+0 36 2.1	22.0	203 54 26.4	2 55 13.6
22.5	119 34 6.9	4 12 45.8	22.5	171 56 58.9	-0 1 43.4	22.5	210 58 12.8	3 24 11.5
23.0	126 26 25.3	3 49 1.8	23.0	179 6 5.3	0 39 40.1	23.0	218 1 51.7	3 49 59.8
23.5	133 23 36.3	+3 21 39.4	23.5	186 17 38.9	-1 17 10.0	23.5	225 5 3.5	-4 12 14.2
24.0	140 25 41.7	2 50 56.0	24.0	193 31 18.2	1 53 34.0	24.0	232 7 24.8	4 30 34.6
24.5	147 32 37.7	2 17 13.9	24.5	200 46 35.1	2 28 13.3	24.5	239 8 28.5	4 44 45.2
25.0	154 44 14.5	1 41 0.3	25.0	208 2 54.9	3 0 30.2	25.0	246 7 45.0	4 54 35.2
25.5	162 0 14.5	1 2 48.0	25.5	215 19 36.5	3 29 49.6	25.5	253 4 42.8	4 59 59.1
26.0	169 20 11.9	+0 23 14.5	26.0	222 35 53.4	-3 55 40.1	26.0	259 58 50.2	-5 0 56.5
26.5	176 43 32.6	-0 16 58.8	26.5	229 50 56.0	4 17 35.4	26.5	266 49 36.9	4 57 32.3
27.0	184 9 33.8	0 57 7.3	27.0	237 3 52.6	4 35 15.1	27.0	273 36 34.6	4 49 56.2
27.5	191 37 24.7	1 36 24.3	27.5	244 13 52.0	4 48 25.2	27.5	280 19 19.1	4 38 21.8
28.0	199 6 7.7	2 14 3.4	28.0	251 20 6.0	4 56 58.5	28.0	286 57 31.0	4 23 6.6
28.5	206 34 40.3	-2 49 20.6	28.5	258 21 50.8	-5 0 54.3	28.5	293 30 56.5	-4 4 30.8
29.0	214 1 57.3	3 21 35.6	29.0	265 18 29.4	5 0 18.2	29.0	299 59 28.3	3 42 56.2
29.5	221 26 53.3	3 50 13.4	29.5	272 9 32.7	4 55 20.9	29.5	306 23 5.2	3 18 46.1
30.0	228 48 25.4	4 14 45.9	30.0	278 54 40.5	4 46 17.9	30.0	312 41 52.7	2 52 24.2
30.5	236 5 35.9	4 34 52.8	30.5	285 33 41.6	4 33 27.4	30.5	318 56 2.8	2 24 14.0
31.0	243 17 34.7	-4 50 21.3	31.0	292 6 34.2	-4 17 10.0	31.0	325 5 52.9	-1 54 38.6
31.5	250 23 40.6	-5 1 6.3	31.5	298 33 25.2	-3 57 47.7	31.5	331 11 45.6	-1 24 0.1

212 MOON'S EQUATOR, LONGITUDE, ETC., 1913.

GREENWICH MEAN NOON.

Date.	MOON'S EQUATOR.			IV Longitude of the Moon's Perigee. Daily Motion +6'.684.	Ω Mean Longitude of Moon's Ascending Node. Daily Mo- tion, -3' 177.	C Moon's Mean Longitude.	Mean Solar Days.	Motion of Moon in Mean Longitude.
	i Inclination to the Earth's Equator	Δ Ascending Node on Earth's Equator to As- cending Node on Ecliptic.	Ω' Ascending Node on Earth's Equator.					
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "		° ' "
Jan. 0	21 56.0	188 16.0	359 26.7	143 16.4	7 45.3	191 58.7	0.1	1 19.06
10	21 55.9	187 42.1	359 29.0	144 23.2	7 13.5	323 44.6	0.2	2 38.12
20	21 55.8	187 8.3	359 31.2	145 30.1	6 41.8	95 30.4	0.3	3 57.18
30	21 55.7	186 34.4	359 33.5	146 36.9	6 10.0	227 16.2	0.4	5 16.23
Feb. 9	21 55.6	186 0.6	359 35.8	147 43.8	5 38.2	359 2.1	0.5	6 35.29
							0.6	7 54.35
19	21 55.5	185 26.7	359 38.0	148 50.6	5 6.4	130 47.9	0.7	9 13.41
Mar. 1	21 55.4	184 52.8	359 40.3	149 57.4	4 34.7	262 33.8	0.8	10 32.47
11	21 55.3	184 19.0	359 42.6	151 4.3	4 2.9	34 19.6	0.9	11 51.53
21	21 55.3	183 45.1	359 44.9	152 11.1	3 31.1	166 5.4	1.0	13 10.58
31	21 55.2	183 11.2	359 47.1	153 18.0	2 59.4	297 51.3	2.0	26 21.17
Apr. 10	21 55.2	182 37.3	359 49.4	154 24.8	2 27.6	69 37.1	3.0	39 31.75
20	21 55.1	182 3.4	359 51.7	155 31.7	1 55.8	201 23.0	4.0	52 42.33
30	21 55.1	181 29.6	359 54.0	156 38.5	1 24.0	333 8.8	5.0	65 52.92
May 10	21 55.1	180 55.7	359 56.3	157 45.3	0 52.3	104 54.6	6.0	79 3.50
20	21 55.1	180 21.8	359 58.5	158 52.2	0 20.5	236 40.5	7.0	92 14.09
							8.0	105 24.67
30	21 55.1	179 48.0	0 0.8	159 59.0	359 48.7	8 26.3	9.0	118 35.25
June 9	21 55.1	179 14.1	0 3.1	161 5.9	359 16.9	140 12.1	10.0	131 45.84
19	21 55.1	178 40.2	0 5.4	162 12.7	358 45.2	271 58.0	Hours.	° ' "
29	21 55.1	178 6.4	0 7.6	163 19.6	358 13.4	43 43.8	1	0 32.94
July 9	21 55.2	177 32.5	0 9.9	164 26.4	357 41.6	175 29.7	2	1 5.88
							3	1 38.82
19	21 55.2	176 58.6	0 12.2	165 33.2	357 9.9	307 15.5	4	2 11.76
29	21 55.2	176 24.8	0 14.5	166 40.1	356 38.1	79 1.3	5	2 44.70
Aug. 8	21 55.3	175 50.9	0 16.8	167 46.9	356 6.3	210 47.2	6	3 17.65
18	21 55.4	175 17.0	0 19.0	168 53.8	355 34.5	342 33.0	7	3 50.59
28	21 55.5	174 43.2	0 21.3	170 0.6	355 2.8	114 18.9	8	4 23.53
							9	4 56.47
Sept. 7	21 55.5	174 9.3	0 23.6	171 7.5	354 31.0	246 4.7	10	5 29.41
17	21 55.6	173 35.4	0 25.8	172 14.3	353 59.2	17 50.5	11	6 2.35
27	21 55.7	173 1.6	0 28.1	173 21.1	353 27.4	149 36.4	12	6 35.29
Oct. 7	21 55.8	172 27.7	0 30.4	174 28.0	352 55.7	281 22.2	13	7 8.23
17	21 55.9	171 53.8	0 32.6	175 34.8	352 23.9	53 8.0	14	7 41.17
							15	8 14.11
27	21 56.1	171 20.0	0 34.9	176 41.7	351 52.1	184 53.9	16	8 47.06
Nov. 6	21 56.2	170 46.1	0 37.1	177 48.5	351 20.4	316 39.7	17	9 20.00
16	21 56.3	170 12.3	0 39.4	178 55.3	350 48.6	88 25.6	18	9 52.94
26	21 56.5	169 38.5	0 41.6	180 2.2	350 16.8	220 11.4	19	10 25.88
Dec. 6	21 56.6	169 4.6	0 43.8	181 9.0	349 45.0	351 57.2	20	10 58.82
							21	11 31.76
16	21 56.8	168 30.8	0 46.1	182 15.9	349 13.3	123 43.1	22	12 4.70
26	21 57.0	167 57.0	0 48.3	183 22.7	348 41.5	255 28.9	23	12 37.64
36	21 57.2	167 23.2	0 50.5	184 29.6	348 9.7	27 14.7		

QUANTITIES REQUIRED IN COMPUTING THE MOON'S LIBRATION.

ARGUMENT, ($\Omega - \lambda$), or ($\Omega - \lambda - 180^\circ$).

$\Omega - \lambda$	μ	$\frac{1}{A}$	B	$\Omega - \lambda$
0	'		0 '	0
0	0.0	37	0 0.0	180
2	0.0	37	0 3.2	178
4	0.1	37	0 6.4	176
6	0.1	38	0 9.6	174
8	0.2	38	0 12.8	172
10	0.2	38	0 16.0	170
12	0.3	38	0 19.2	168
14	0.3	38	0 22.3	166
16	0.3	39	0 25.4	164
18	0.4	39	0 28.5	162
20	0.4	40	0 31.5	160
22	0.4	40	0 34.5	158
24	0.5	41	0 37.5	156
26	0.5	42	0 40.4	154
28	0.5	42	0 43.2	152
30	0.5	43	0 46.1	150
32	0.6	44	0 48.8	148
34	0.6	45	0 51.5	146
36	0.6	46	0 54.1	144
38	0.6	47	0 56.7	142
40	0.6	49	0 59.2	140
42	0.6	50	I 1.6	138
44	0.6	52	I 4.0	136
46	0.6	54	I 6.3	134
48	0.6	56	I 8.5	132
50	0.6	58	I 10.6	130
52	0.6	61	I 12.6	128
54	0.6	64	I 14.5	126
56	0.6	67	I 16.4	124
58	0.6	70	I 18.1	122
60	0.5	75	I 19.8	120
62	0.5	80	I 21.3	118
64	0.5	85	I 22.8	116
66	0.5	92	I 24.1	114
68	0.4	100	I 25.4	112
70	0.4	109	I 26.5	110
72	0.4	121	I 27.6	108
74	0.3	135	I 28.5	106
76	0.3	154	I 29.4	104
78	0.3	180	I 30.1	102
80	0.2	215	I 30.7	100
82	0.2	268	I 31.2	98
84	0.1	357	I 31.6	96
86	0.1	535	I 31.9	94
88	0.0	1070	I 32.0	92
90	0.0	∞	I 32.1	90

μ has the sign of $\tan (\lambda - \Omega)$
 A has the sign of $\cos (\Omega - \lambda)$
 B has the sign of $\sin (\Omega - \lambda)$
See formulæ, page xi.

SUN'S ABERRATION AND HORIZONTAL PARALLAX.

FOR GREENWICH MEAN NOON.

Date.	Aberration.	Hor. Par.
1913.	"	"
Jan. 0	-20.81	8.95
10	20.81	8.95
20	20.80	8.94
30	20.77	8.93
Feb. 9	20.74	8.92
19	-20.70	8.90
Mar. 1	20.65	8.88
11	20.59	8.86
21	20.54	8.83
31	20.48	8.81
Apr. 10	-20.42	8.78
20	20.36	8.76
30	20.31	8.73
May 10	20.26	8.71
20	20.22	8.69
30	-20.18	8.68
June 9	20.15	8.67
19	20.14	8.66
29	20.13	8.65
July 9	20.13	8.66
19	-20.14	8.66
29	20.16	8.67
Aug. 8	20.18	8.68
18	20.22	8.70
28	20.26	8.72
Sept. 7	-20.31	8.74
17	20.37	8.76
27	20.42	8.78
Oct. 7	20.48	8.81
17	20.54	8.83
27	-20.60	8.86
Nov. 6	20.65	8.88
16	20.70	8.90
26	20.74	8.92
Dec. 6	20.77	8.93
16	-20.80	8.94
26	20.81	8.95
36	-20.81	8.95

Sun's Mean Equatorial Horizontal Parallax.

8''.80; $\log = 0.94448$.

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PRECESSION AND OBLIQUITY, 1913.

(CONSTANTS OF PARIS CONFERENCE.)

FOR GREENWICH MEAN NOON.

Date.	Preces- sion in Longi- tude from 1913.0.	Nutation.			Obliquity of Ecliptic. (Newcomb.)	Date.	Preces- sion in Longi- tude from 1913.0.	Nutation.			Obliquity of Ecliptic. (Newcomb.)
		$\delta' \psi$ In Longi- tude.	$\delta' \alpha$ In R. A.	$\delta' \omega$ In Obliqui- ty.				$\delta' \psi$ In Longi- tude.	$\delta' \alpha$ In R. A.	$\delta' \omega$ In Obliqui- ty.	
	"	"	s	"	23° 27'		"	"	s	"	23° 27'
Jan. 0	- 0.06	-1.86	-0.114	+8.52	10.69	July 4	+25.39	+1.09	+0.067	+8.63	10.57
5	+ 0.63	1.56	0.095	8.57	10.73	9	26.08	1.35	0.083	8.68	10.60
10	1.32	1.28	0.078	8.63	10.78	14	26.77	1.57	0.096	8.74	10.65
15	2.00	1.03	0.063	8.70	10.85	19	27.46	1.77	0.108	8.80	10.71
20	2.69	0.81	0.050	8.78	10.92	24	28.14	1.96	0.120	8.86	10.77
25	+ 3.38	-0.63	-0.039	+8.87	11.01	29	+28.83	+2.11	+0.129	+8.94	10.84
30	4.07	0.48	0.029	8.97	11.10	Aug. 3	29.52	2.23	0.136	9.03	10.92
Feb. 4	4.76	0.38	0.023	9.07	11.20	8	30.21	2.31	0.141	9.12	11.00
9	5.44	0.31	0.019	9.17	11.29	13	30.89	2.35	0.144	9.20	11.08
14	6.13	0.28	0.017	9.27	11.38	18	31.58	2.37	0.145	9.29	11.16
19	+ 6.82	-0.29	-0.018	+9.37	11.47	23	+32.27	+2.36	+0.144	+9.36	11.23
24	7.51	0.35	0.021	9.45	11.55	28	32.96	2.31	0.141	9.44	11.30
Mar. 1	8.20	0.42	0.026	9.52	11.61	Sept. 2	33.65	2.23	0.136	9.50	11.36
6	8.88	0.51	0.031	9.58	11.66	7	34.33	2.14	0.131	9.56	11.40
11	9.57	0.63	0.039	9.62	11.70	12	35.02	2.03	0.124	9.59	11.43
16	+10.26	-0.77	-0.047	+9.64	11.72	17	+35.71	+1.90	+0.116	+9.61	11.45
21	10.95	0.90	0.055	9.65	11.72	22	36.40	1.76	0.108	9.61	11.44
26	11.63	1.04	0.064	9.65	11.71	27	37.09	1.61	0.099	9.60	11.42
31	12.32	1.17	0.072	9.62	11.68	Oct. 2	37.77	1.47	0.090	9.58	11.39
Apr. 5	13.01	1.29	0.079	9.58	11.63	7	38.46	1.35	0.083	9.54	11.35
10	+13.70	-1.39	-0.085	+9.53	11.57	12	+39.15	+1.25	+0.077	+9.48	11.29
15	14.39	1.47	0.090	9.47	11.51	17	39.84	1.17	0.072	9.42	11.22
20	15.07	1.52	0.093	9.40	11.43	22	40.53	1.11	0.068	9.34	11.13
25	15.76	1.54	0.094	9.32	11.34	27	41.21	1.09	0.067	9.25	11.04
30	16.45	1.52	0.093	9.23	11.24	Nov. 1	41.90	1.10	0.067	9.15	10.93
May 5	+17.14	-1.47	-0.090	+9.14	11.15	6	+42.59	+1.16	+0.071	+9.04	10.82
10	17.83	1.38	0.084	9.04	11.05	11	43.28	1.25	0.077	8.94	10.71
15	18.51	1.26	0.077	8.95	10.95	16	43.96	1.38	0.084	8.84	10.60
20	19.20	1.11	0.068	8.87	10.86	21	44.65	1.54	0.094	8.74	10.50
25	19.89	0.93	0.057	8.80	10.78	26	45.34	1.75	0.107	8.65	10.41
30	+20.58	-0.72	-0.044	+8.73	10.71	Dec. 1	+46.03	+1.99	+0.122	+8.57	10.32
June 4	21.26	0.49	0.030	8.67	10.64	6	46.72	2.26	0.138	8.50	10.24
9	21.95	-0.24	-0.015	8.63	10.59	11	47.40	2.55	0.156	8.45	10.18
14	22.64	+0.02	+0.001	8.60	10.56	16	48.09	2.85	0.174	8.42	10.14
19	23.33	0.29	0.018	8.59	10.54	21	48.78	3.16	0.193	8.40	10.12
24	+24.02	+0.56	+0.034	+8.59	10.53	26	+49.47	+3.47	+0.212	+8.40	10.11
29	24.70	0.83	0.051	8.60	10.54	31	50.16	3.77	0.231	8.42	10.12
July 4	+25.39	+1.09	+0.067	+8.63	10.57	36	+50.84	+4.07	+0.249	+8.45	10.14

Precession for 1913 . . 50.2593 log=1.70122
Precession in a Solar day 0.1376 log=9.13862
Precession in a Sidereal day 0.1372 log=9.13735
The short period terms of the Nutation are given
for Washington midnight on pp. 231-232.

Mean Obliquity, 1913.0.
Newcomb 23 27 2.17
Hansen 23 27 1.94
Le Verrier 23 27 1.85
Peters 23 27 1.73

[Eph 13]

PART II.

ASTRONOMICAL EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

FROM MEAN TO APPARENT PLACE FOR THE YEAR 1913.

The constants of precession, nutation and aberration adopted by the *Conférence Internationale des Étoiles Fondamentales* which met in Paris in May, 1896, are given on page xiv, and together with the notation of Bessel are used in the formulæ which follow.

BESSELIAN STAR-NUMBERS.

<i>Terms of Long Period.</i>	<i>Terms of Short Period.</i>
$A = \tau - 0.342\ 19 \sin \Omega$	$-0.004\ 05 \sin 2 \zeta$
$+ 0.004\ 15 \sin 2 \Omega$	$+0.000\ 23 \sin (\zeta + \Gamma')$
$- 0.025\ 26 \sin 2 L$	$+0.001\ 34 \sin (\zeta - \Gamma')$
$+ 0.002\ 51 \sin (L - \Gamma)$	$-0.000\ 68 \sin (2 \zeta - \Omega)$
$- 0.000\ 99 \sin (3 L - \Gamma)$	$-0.000\ 52 \sin (3 \zeta - \Gamma')$
$+ 0.000\ 42 \sin (L + \Gamma)$	$+0.000\ 30 \sin (\zeta - 2 L + \Gamma')$
$+ 0.000\ 25 \sin (2 L - \Omega)$	$+0.000\ 12 \sin 2 (\zeta - L)$
"	"
$B = - 9.210 \cos \Omega$	$-0.088 \cos 2 \zeta$
$+ 0.090 \cos 2 \Omega$	$-0.018 \cos (2 \zeta - \Omega)$
$- 0.552 \cos 2 L$	$-0.011 \cos (3 \zeta - \Gamma')$
$- 0.022 \cos (3 L - \Gamma)$	$+0.005 \cos (\zeta + \Gamma')$
$+ 0.009 \cos (L + \Gamma)$	
$+ 0.007 \cos (2 L - \Omega)$	
$C = -20.4700 \cos \omega \cos \odot$	
$D = -20.4700 \sin \odot$	
$E = - 0.0419 \sin \Omega + 0''.0005 \sin 2 \Omega - 0''.0031 \sin 2 L$	

BESSEL'S Star-Constants.

$a = 3^s.072\ 58 + 1^s.336\ 39 \sin \alpha_0 \tan \delta_0$	$a' = 20''.0457 \cos \alpha_0$
$b = \frac{1}{15} \cos \alpha_0 \tan \delta_0$	$b' = -\sin \alpha_0$
$c = \frac{1}{15} \cos \alpha_0 \sec \delta_0$	$c' = \tan \omega \cos \delta_0 - \sin \alpha_0 \sin \delta_0$
$d = \frac{1}{15} \sin \alpha_0 \sec \delta_0$	$d' = \cos \alpha_0 \sin \delta_0$

Formulæ for Reduction to Apparent Position.

$$\begin{aligned} * \alpha &= \alpha_0 + \tau \mu + Aa + Bb + Cc + Dd + \frac{1}{15} E & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + Aa' + Bb' + Cc' + Dd' & (\text{in arc}) \end{aligned}$$

INDEPENDENT STAR-NUMBERS.

$$\begin{aligned} f + f' &= +46''.0886 A + E \text{ (in arc)} = 3^s.072\ 58 A + \frac{1}{15} E & (\text{in time}) \\ f' &= - 0^s.0124 \sin 2 \zeta + 0^s.0041 \sin (\zeta - \Gamma') + 0^s.0007 \sin (\zeta + \Gamma') \\ &\quad - 0^s.0021 \sin (2 \zeta - \Omega) - 0^s.0016 \sin (3 \zeta - \Gamma') \\ &\quad + 0^s.0009 \sin (\zeta - 2 L + \Gamma') + 0^s.0004 \sin 2 (\zeta - L) \\ g \sin G &= B & h \sin H &= C & i &= C \tan \omega \\ g \cos G &= 20''.0457 A & h \cos H &= D \end{aligned}$$

Formulæ for Reduction to Apparent Position.

$$\begin{aligned} * \alpha &= \alpha_0 + f + f' + \tau \mu + \frac{1}{15} g \sin (G + \alpha_0) \tan \delta_0 + \frac{1}{15} h \sin (H + \alpha_0) \sec \delta_0 & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + g \cos (G + \alpha_0) + h \cos (H + \alpha_0) \sin \delta_0 + i \cos \delta_0 & (\text{in arc}) \end{aligned}$$

In the above formulæ,

τ denotes the time reckoned in units of one year, from the beginning of the Besselian fictitious year (1913, January 0^d.248, Washington mean time)
 α_0, δ_0 , the star's mean R. A. and Decl. at the beginning of the fictitious year,
 α, δ , the star's apparent right ascension and declination at the time τ ,
 μ, μ' , the annual proper motion in right ascension and declination,

\odot , the Sun's true longitude,
 L , the Sun's mean longitude,
 Ω , the longitude of the Moon's ascending node,

ω , the obliquity of the ecliptic,
 Γ , the long. of the Sun's perigee,
 Γ' , the long. of the Moon's perigee
 ζ , the Moon's mean longitude.

* See page 217 for statement concerning the use of these formulæ.

The independent star-numbers are more convenient than BESSEL'S, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy.

In using the star-constants of the *British Association Catalogue*, $a, b, c, d, a', b', c', d'$, with the star-numbers of this Ephemeris, the quantities to be computed are $Ac, Bd, Ca, Db, -Ac', -Bd', -Ca', -Db'$.

In the computation of the independent star-numbers given for Washington mean midnight of each day of the year, on pages 222-229, the short-period terms—that is, the terms involving the Moon's mean longitude—have been included in the two columns headed G and $\text{Log } g$. The quantities f and f' correspond to f' and f'' , respectively, as given on the page of constants in Part IV of the American Ephemeris for the years 1901 to 1911, inclusive, and are tabulated in the third and fourth columns, respectively, giving separately the effect of the long-period and short-period terms. f' differs but slightly from the term $-0''.1866 \sin 2\zeta + 0''.0622 \sin (\zeta - I')$ given on page 37 of the *Procès-Verbaux* of the Paris Conference, and also on page 289 of the American Ephemeris and Nautical Almanac for 1900. In computing the reduction of stars from mean to apparent place, or vice versa, using the independent star-numbers, the quantity f' (which is the same for all stars) should be omitted in using the formulæ for α on page 216, in case it is desired to make the reduction in conformity with the decision of the Paris Conference with reference to this matter. See page of *Procès-Verbaux* above cited.

In the computation of the Besselian star-numbers, pages 218-221, all short-period terms have been included, and hence in using these quantities in the reduction of stars to apparent place by means of the formulæ for that purpose on page 216, f' must be subtracted from the final result if it is desired, in compliance with the decision of the Paris Conference, to omit that quantity.

In computing the ephemerides of the circumpolar stars in this volume, all short-period terms have been included, excepting the quantity f' above mentioned, which has been omitted.

In the computation of the ephemerides of the ten-day stars, no short-period terms have been included. These terms attain two maxima and two minima during the tropical month. At maximum and minimum they may amount in right ascension to $\pm 0''.008 \tan \delta$, and in declination to $\pm 0''.13$. For computing the effect of these terms for the correction of the positions of stars interpolated from the ten-day ephemerides, the following formulæ may be used, in which $\Delta\alpha$ and $\Delta\delta$ denote the effect of the short-period terms in right ascension and declination, respectively, and $\delta''\psi$ and $\delta''\omega$, the sum of the short-period terms of the nutation in longitude and obliquity:

$$\begin{aligned}\Delta\alpha &= D'_{\psi}\alpha \delta''\psi + D_{\omega}\alpha \delta''\omega \\ \Delta\delta &= D_{\psi}\delta \delta''\psi + D_{\omega}\delta \delta''\omega\end{aligned}$$

The values of $\delta''\psi$ and of $\delta''\omega$ for Washington mean midnight are given for each day of the year on pages 231-232, and have been computed as follows:

$$\delta''\psi = 50''.37 A_2 \qquad \delta''\omega = -B_2$$

in which A_2 and B_2 are the sums of the short-period terms given in the expressions for A and B on page 216.

The quantities $D'_{\psi}\alpha$, $D_{\omega}\alpha$, $D_{\psi}\delta$, and $D_{\omega}\delta$ are given for each ten-day star on pages 287-486, and have been computed by means of the following formulæ:

$$\begin{aligned}D'_{\psi}\alpha &= \frac{1}{18} \sin \alpha \tan \delta \sin \omega & D_{\omega}\alpha &= -\frac{1}{18} \cos \alpha \tan \delta \\ D_{\psi}\delta &= \cos \alpha \sin \omega & D_{\omega}\delta &= \sin \alpha\end{aligned}$$

The complete derivative of the right ascension with reference to ψ is

$$D_{\psi}\alpha = \frac{1}{18} (\cos \omega + \sin \alpha \tan \delta \sin \omega)$$

and the omission of the term $\frac{1}{18} \cos \omega$ is made in accordance with the above-mentioned decision of the Paris Conference with reference to the quantity f' .

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
Jan. 0	-8.57680	-0.9340	-0.52236	+1.30418	Feb. 15	+9.07306	-0.9636	-1.19705	+1.04775
1	8.54120	0.9321	0.56321	1.30272	16	9.09191	0.9644	1.20193	1.03576
2	8.48841	0.9300	0.60041	1.30111	17	9.10944	0.9665	1.20662	1.02330
3	8.41397	0.9283	0.63456	1.29936	h 18	9.12392	0.9694	1.21112	1.01034
h 4	8.31048	0.9273	0.66609	1.29747	(10.0) 19	9.13440	0.9727	1.21545	0.99686
(7.0) 5	-8.16761	-0.9275	-0.69536	+1.29542	20	+9.14087	-0.9758	-1.21959	+0.98280
6	7.96095	0.9287	0.72265	1.29323	21	9.14423	0.9782	1.22356	0.96814
7	-7.60853	0.9306	0.74819	1.29090	22	9.14585	0.9794	1.22737	0.95284
8	+6.49136	0.9332	0.77218	1.28840	23	9.14749	0.9794	1.23100	0.93685
9	7.59106	0.9360	0.79479	1.28576	24	9.15080	0.9784	1.23447	0.92012
10	+7.82413	-0.9387	-0.81614	+1.28297	25	+9.15682	-0.9768	-1.23778	+0.90258
11	7.94448	0.9409	0.83635	1.28001	26	9.16566	0.9752	1.24093	0.88418
12	8.01995	0.9424	0.85554	1.27690	27	9.17661	0.9740	1.24392	0.86482
13	8.07846	0.9430	0.87377	1.27363	28	9.18862	0.9736	1.24676	0.84443
14	8.13704	0.9428	0.89114	1.27020	Mar. 1	9.20048	0.9742	1.24945	0.82292
15	+8.20412	-0.9417	-0.90770	+1.26660	2	+9.21112	-0.9757	-1.25199	+0.80014
16	8.28353	0.9401	0.92352	1.26283	3	9.21982	0.9777	1.25438	0.77597
17	8.37088	0.9386	0.93865	1.25889	4	9.22638	0.9801	1.25662	0.75025
18	8.45924	0.9376	0.95313	1.25478	5	9.23081	0.9824	1.25872	0.72279
h 19	8.54133	0.9376	0.96701	1.25050	h 6	9.23335	0.9845	1.26067	0.69334
(8.0) 20	+8.61257	-0.9389	-0.98032	+1.24603	(11.0) 7	+9.23447	-0.9860	-1.26248	+0.66163
21	8.66997	0.9414	0.99310	1.24138	8	9.23480	0.9867	1.26416	0.62729
22	8.71307	0.9448	1.00538	1.23654	9	9.23507	0.9867	1.26569	0.58988
23	8.74296	0.9484	1.01719	1.23151	10	9.23618	0.9858	1.26709	0.54882
24	8.76223	0.9517	1.02855	1.22628	11	9.23900	0.9842	1.26835	0.50334
25	+8.77404	-0.9539	-1.03948	+1.22086	12	+9.24415	-0.9823	-1.26948	+0.45240
26	8.78269	0.9549	1.05001	1.21522	13	9.25178	0.9805	1.27046	0.39464
27	8.79267	0.9547	1.06016	1.20938	14	9.26152	0.9793	1.27132	0.32786
28	8.80702	0.9536	1.06994	1.20332	15	9.27219	0.9792	1.27204	0.24879
29	8.82692	0.9521	1.07937	1.19703	16	9.28265	0.9800	1.27263	0.15196
30	+8.85156	-0.9508	-1.08846	+1.19052	17	+9.29181	-0.9820	-1.27309	+0.02708
31	8.87910	0.9502	1.09723	1.18377	18	9.29880	0.9844	1.27342	9.85103
Feb. 1	8.90682	0.9505	1.10569	1.17677	19	9.30320	0.9869	1.27361	9.55018
2	8.93247	0.9518	1.11386	1.16952	20	9.30521	0.9887	1.27368	+6.58776
h 3	8.95477	0.9539	1.12174	1.16202	h 21	9.30572	0.9896	1.27361	-9.54895
(9.0) 4	+8.97280	-0.9566	-1.12934	+1.15425	(12.0) 22	+9.30608	-0.9892	-1.27342	-9.85004
5	8.98655	0.9595	1.13667	1.14620	23	9.30737	0.9878	1.27309	0.02598
6	8.99638	0.9625	1.14375	1.13786	24	9.31044	0.9856	1.27264	0.15069
7	9.00290	0.9650	1.15058	1.12922	25	9.31561	0.9832	1.27205	0.24731
8	9.00706	0.9669	1.15716	1.12028	26	9.32267	0.9810	1.27134	0.32616
9	+9.01009	-0.9679	-1.16351	+1.11100	27	+9.33086	-0.9796	-1.27049	-0.39272
10	9.01339	0.9681	1.16964	1.10140	28	9.33931	0.9791	1.26952	0.45029
11	9.01847	0.9675	1.17554	1.09144	29	9.34714	0.9795	1.26841	0.50097
12	9.02670	0.9663	1.18122	1.08111	30	9.35378	0.9806	1.26717	0.54621
13	9.03886	0.9650	1.18670	1.07040	31	9.35894	0.9821	1.26580	0.58704
14	+9.05477	-0.9638	-1.19197	+1.05929	Apr. 1	+9.36260	-0.9838	-1.26430	-0.62423
15	+9.07306	-0.9636	-1.19705	+1.04775	2	+9.36480	-0.9851	-1.26266	-0.65835

E = 0''.00 = 0^h.000

[Eph 13]

FOR WASHINGTON MEAN MIDNIGHT.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log P.	Log C.	Log D.
July 1	+9.71160	-0.9304	+0.50025	-1.30486	Aug. 16	+9.83026	-0.9686	+1.17987	-1.08365
2	9.71669	0.9299	0.54055	1.30357	17	9.83108	0.9709	1.18513	1.07356
3	9.72188	0.9307	0.57731	1.30214	18	9.83158	0.9725	1.19021	1.06309
4	9.72668	0.9327	0.61110	1.30060	19	9.83192	0.9734	1.19512	1.05224
h 5	9.73075	0.9356	0.64233	1.29892	h 20	9.83229	0.9734	1.19985	1.04098
(19.0) 6	+9.73385	-0.9387	+0.67135	-1.29712	(22.0) 21	+9.83292	-0.9726	+1.20441	-1.02929
7	9.73599	0.9414	0.69844	1.29519	22	9.83398	0.9716	1.20880	1.01715
8	9.73743	0.9431	0.72383	1.29313	23	9.83558	0.9701	1.21304	1.00452
9	9.73859	0.9435	0.74770	1.29094	24	9.83778	0.9689	1.21710	0.99138
10	9.73993	0.9428	0.77021	1.28862	25	9.84051	0.9683	1.22102	0.97769
11	+9.74185	-0.9413	+0.79149	-1.28617	26	+9.84353	-0.9687	+1.22477	-0.96342
12	9.74458	0.9392	0.81167	1.28358	27	9.84654	0.9701	1.22838	0.94854
13	9.74810	0.9373	0.83083	1.28085	28	9.84922	0.9725	1.23183	0.93299
14	9.75219	0.9363	0.84907	1.27798	29	9.85128	0.9754	1.23514	0.91672
15	9.75651	0.9363	0.86646	1.27498	30	9.85267	0.9784	1.23830	0.89969
16	+9.76072	-0.9375	+0.88307	-1.27183	31	+9.85342	-0.9809	+1.24131	-0.88182
17	9.76447	0.9395	0.89895	1.26854	Sept. 1	9.85374	0.9823	1.24418	0.86304
18	9.76760	0.9421	0.91416	1.26510	2	9.85395	0.9824	1.24691	0.84328
19	9.77008	0.9449	0.92874	1.26151	3	9.85440	0.9814	1.24950	0.82244
20	9.77193	0.9476	0.94272	1.25777	h 4	9.85538	0.9796	1.25196	0.80041
h 21	+9.77328	-0.9497	+0.95616	-1.25388	(28.0) 5	+9.85698	-0.9777	+1.25427	-0.77705
(20.0) 22	9.77431	0.9511	0.96908	1.24982	6	9.85916	0.9761	1.25646	0.75223
23	9.77522	0.9518	0.98152	1.24561	7	9.86173	0.9753	1.25850	0.72575
24	9.77624	0.9516	0.99349	1.24123	8	9.86438	0.9755	1.26042	0.69742
25	9.77762	0.9507	1.00503	1.23668	9	9.86681	0.9766	1.26220	0.66695
26	+9.77954	-0.9493	+1.01615	-1.23197	10	+9.86883	-0.9785	+1.26385	-0.63403
27	9.78213	0.9479	1.02688	1.22708	11	9.87036	0.9808	1.26537	0.59826
28	9.78539	0.9468	1.03724	1.22200	12	9.87135	0.9830	1.26676	0.55912
29	9.78919	0.9466	1.04724	1.21675	13	9.87188	0.9849	1.26803	0.51595
30	9.79320	0.9474	1.05690	1.21130	14	9.87211	0.9861	1.26916	0.46783
31	+9.79703	-0.9495	+1.06624	-1.20566	15	+9.87216	-0.9867	+1.27017	-0.41353
Aug. 1	9.80036	0.9524	1.07526	1.19982	16	9.87220	0.9865	1.27105	0.35128
2	9.80292	0.9559	1.08398	1.19378	17	9.87243	0.9855	1.27180	0.27841
3	9.80467	0.9591	1.09242	1.18753	18	9.87301	0.9839	1.27243	0.19057
4	9.80574	0.9616	1.10057	1.18106	19	9.87406	0.9818	1.27293	0.07996
h 5	+9.80640	-0.9628	+1.10846	-1.17437	h 20	+9.87565	-0.9799	+1.27330	-9.93129
(21.0) 6	9.80710	0.9628	1.11609	1.16745	(0.0) 21	9.87775	0.9785	1.27355	9.70273
7	9.80816	0.9618	1.12347	1.16030	22	9.88018	0.9779	1.27367	-9.18934
8	9.80986	0.9602	1.13061	1.15289	23	9.88272	0.9782	1.27366	+9.29076
9	9.81224	0.9586	1.13751	1.14524	24	9.88508	0.9796	1.27352	9.73677
10	+9.81519	-0.9576	+1.14419	-1.13732	25	+9.88698	-0.9817	+1.27326	+9.95215
11	9.81846	0.9575	1.15065	1.12912	26	9.88827	0.9841	1.27287	0.09546
12	9.82170	0.9584	1.15690	1.12065	27	9.88896	0.9859	1.27235	0.20299
13	9.82463	0.9604	1.16294	1.11188	28	9.88922	0.9870	1.27171	0.28906
14	9.82708	0.9630	1.16877	1.10279	29	9.88930	0.9868	1.27093	0.36079
15	+9.82896	-0.9658	+1.17442	-1.09339	30	+9.88953	-0.9854	+1.27002	+0.42225
16	+9.83026	-0.9686	+1.17987	-1.08365	Oct. 1	+9.89022	-0.9831	+1.26899	+0.47601

FOR WASHINGTON MEAN MIDNIGHT.

Star Day. d. Hr.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hr.)	Log A.	Log B.	Log C.	Log D.
I. 0)	1 +9.89022	-0.9831	+1.26899	+0.47601	Nov. 16 h (4.0) 21 22 23 24 25 26 27 28 29 30 Dec. 1 2 3 4 h 5 (5.0) 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 h (6.0) 21 22 23 24 25 26 27 28 29 30 31 32	+9.95620	-0.9404	+1.04012	+1.22053
	2 9.89151	0.9804	1.26782	0.52374		9.95885	0.9403	1.02930	1.22593
	3 9.89337	0.9779	1.26652	0.56665		9.96125	0.9413	1.01805	1.23113
	4 9.89565	0.9760	1.26508	0.60559		9.96319	0.9429	1.00636	1.23614
	5 9.89814	0.9751	1.26351	0.64123		9.96464	0.9445	0.99420	1.24096
	6 +9.90047	-0.9752	+1.26181	+0.67407		+9.96561	-0.9456	+0.98155	+1.24560
	7 9.90251	0.9761	1.25996	0.70448		9.96627	0.9456	0.96837	1.25006
	8 9.90413	0.9775	1.25798	0.73280		9.96692	0.9442	0.95463	1.25434
	9 9.90522	0.9790	1.25586	0.75928		9.96780	0.9418	0.94030	1.25844
	10 9.90590	0.9803	1.25360	0.78412		9.96915	0.9384	0.92534	1.26238
	11 +9.90624	-0.9810	+1.25120	+0.80751		+9.97103	-0.9349	+0.90968	+1.26614
	12 9.90637	0.9810	1.24865	0.82960		9.97340	0.9318	0.89330	1.26974
	13 9.90650	0.9802	1.24595	0.85050		9.97608	0.9297	0.87613	1.27318
	14 9.90676	0.9787	1.24310	0.87032		9.97884	0.9287	0.85811	1.27646
	15 9.90730	0.9764	1.24010	0.88917		9.98147	0.9290	0.83916	1.27958
II. 0)	16 +9.90828	-0.9737	+1.23695	+0.90712		+9.98379	-0.9301	+0.81919	+1.28254
	17 9.90976	0.9710	1.23364	0.92424		9.98566	0.9316	0.79811	1.28535
	18 9.91173	0.9686	1.23018	0.94060		9.98709	0.9331	0.77581	1.28800
	19 9.91405	0.9669	1.22655	0.95625		9.98819	0.9343	0.75216	1.29050
	20 9.91654	0.9662	1.22276	0.97123		9.98906	0.9348	0.72698	1.29286
	21 +9.91896	-0.9667	+1.21879	+0.98560		+9.98982	-0.9344	+0.70011	+1.29506
	22 9.92103	0.9678	1.21466	0.99939		9.99061	0.9332	0.67133	1.29712
	23 9.92258	0.9696	1.21035	1.01263		9.99157	0.9313	0.64033	1.29904
	24 9.92358	0.9710	1.20587	1.02537		9.99283	0.9288	0.60680	1.30081
	25 9.92412	0.9716	1.20120	1.03762		9.99444	0.9260	0.57030	1.30244
	26 +9.92443	-0.9712	+1.19634	+1.04941		+9.99646	-0.9234	+0.53030	+1.30392
	27 9.92482	0.9696	1.19129	1.06077		9.99884	0.9214	0.48608	1.30526
	28 9.92556	0.9668	1.18605	1.07172		0.00145	0.9204	0.43668	1.30647
	29 9.92684	0.9636	1.18060	1.08228		0.00415	0.9206	0.38075	1.30753
	30 9.92871	0.9601	1.17495	1.09246		0.00664	0.9219	0.31637	1.30846
III. 0)	31 +9.93105	-0.9573	+1.16909	+1.10228		+0.00877	-0.9240	+0.24058	+1.30925
	1 9.93366	0.9554	1.16301	1.11176		0.01046	0.9267	0.14852	1.30989
	2 9.93627	0.9546	1.15671	1.12091		0.01167	0.9288	0.03132	1.31041
	3 9.93863	0.9549	1.15017	1.12975		0.01252	0.9299	9.87007	1.31078
	4 9.94061	0.9558	1.14340	1.13828		0.01326	0.9297	9.61041	1.31102
	5 +9.94212	-0.9569	+1.13638	+1.14652		+0.01410	-0.9284	+8.86865	+1.31112
	6 9.94320	0.9579	1.12911	1.15448		0.01529	0.9259	-9.41506	1.31108
	7 9.94394	0.9584	1.12158	1.16217		0.01695	0.9231	9.77377	1.31090
	8 9.94447	0.9583	1.11377	1.16960		0.01906	0.9206	9.96744	1.31059
	9 9.94495	0.9574	1.10569	1.17678		0.02151	0.9189	0.10083	1.31014
	10 +9.94551	-0.9555	+1.09730	+1.18371		+0.02412	-0.9184	-0.20263	+1.30955
	11 9.94632	0.9530	1.08862	1.19040		0.02664	0.9192	0.28493	1.30882
	12 9.94748	0.9500	1.07961	1.19686		0.02891	0.9210	0.35398	1.30795
	13 9.94907	0.9469	1.07028	1.20310		0.03081	0.9235	0.41342	1.30694
	14 9.95113	0.9439	1.06059	1.20912		0.03230	0.9260	0.46558	1.30580
	15 +9.95356	-0.9417	+1.05055	+1.21493		+0.03344	-0.9282	-0.51201	+1.30451
	16 +9.95620	-0.9404	+1.04012	+1.22053		+0.03433	-0.9299	-0.55383	+1.30308

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f'	G		H		Log g .	Log h .	i	Log i .				
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.								
	y	s	s	°	'	h	m	°	'	h	m	"			
Jan. 0	0.0007	-0.108	-0.008	264	58.0	17	39.9	350	36.9	23	22.5	0.93561	1.31003	-1.44	-0.1596
1	0.0034	0.096	0.011	265	20.5	17	41.4	349	40.5	23	18.7	0.93350	1.30981	1.59	0.2005
2	0.0062	0.085	0.010	265	51.2	17	43.4	348	44.0	23	14.9	0.93112	1.30956	1.73	0.2377
3	0.0089	0.073	0.007	266	29.4	17	46.0	347	47.5	23	11.2	0.92910	1.30930	1.87	0.2718
h (7.0) 4	0.0116	0.061	-0.002	267	13.6	17	48.9	346	50.8	23	7.4	0.92790	1.30901	2.01	0.3034
5	0.0144	-0.048	+0.003	268	0.3	17	52.0	345	54.1	23	3.6	0.92778	1.30871	-2.15	-0.3326
6	0.0171	0.036	0.008	268	45.8	17	55.1	344	57.3	22	59.8	0.92880	1.30838	2.29	0.3599
7	0.0199	0.024	0.012	269	27.2	17	57.8	344	0.4	22	56.0	0.93071	1.30804	2.43	0.3855
8	0.0226	0.013	0.014	270	2.5	18	0.2	343	3.4	22	52.2	0.93323	1.30768	2.57	0.4095
9	0.0253	-0.001	0.013	270	31.2	18	2.0	342	6.4	22	48.4	0.93603	1.30730	2.70	0.4321
10	0.0281	+0.010	+0.010	270	52.9	18	3.5	341	9.2	22	44.6	0.93872	1.30690	-2.84	-0.4534
11	0.0308	0.022	+0.005	271	9.5	18	4.6	340	12.0	22	40.8	0.94095	1.30648	2.98	0.4736
12	0.0335	0.033	-0.001	271	22.3	18	5.5	339	14.6	22	37.0	0.94249	1.30605	3.11	0.4928
13	0.0363	0.045	0.008	271	34.1	18	6.3	338	17.1	22	33.1	0.94316	1.30560	3.24	0.5110
14	0.0390	0.056	0.014	271	47.8	18	7.2	337	19.6	22	29.3	0.94292	1.30513	3.38	0.5284
15	0.0418	+0.067	-0.018	272	6.1	18	8.4	336	21.9	22	25.5	0.94195	1.30465	-3.51	-0.5450
16	0.0445	0.079	0.020	272	31.8	18	10.1	335	24.1	22	21.6	0.94054	1.30415	3.64	0.5608
17	0.0472	0.090	0.018	273	6.3	18	12.4	334	26.1	22	17.7	0.93921	1.30364	3.77	0.5759
18	0.0500	0.100	0.012	273	48.7	18	15.3	333	28.1	22	13.9	0.93854	1.30311	3.89	0.5904
h (8.0) 19	0.0527	0.112	-0.005	274	36.1	18	18.4	332	29.9	22	10.0	0.93902	1.30258	4.02	0.6043
20	0.0554	+0.123	+0.003	275	24.1	18	21.6	331	31.6	22	6.1	0.94085	1.30202	-4.15	-0.6176
21	0.0582	0.134	0.010	276	7.5	18	24.5	330	33.1	22	2.2	0.94390	1.30146	4.27	0.6304
22	0.0609	0.144	0.015	276	42.3	18	26.8	329	34.5	21	58.3	0.94776	1.30088	4.39	0.6427
23	0.0637	0.155	0.015	277	7.2	18	28.5	328	35.8	21	54.4	0.95178	1.30030	4.51	0.6545
24	0.0664	0.165	0.013	277	23.0	18	29.5	327	36.9	21	50.5	0.95530	1.29970	4.63	0.6658
25	0.0691	+0.176	+0.007	277	32.8	18	30.2	326	37.9	21	46.5	0.95768	1.29910	-4.75	-0.6768
26	0.0719	0.186	0.000	277	40.8	18	30.7	325	38.7	21	42.6	0.95878	1.29848	4.87	0.6873
27	0.0746	0.196	-0.005	277	51.5	18	31.4	324	39.3	21	38.6	0.95877	1.29786	4.98	0.6974
28	0.0774	0.206	0.009	278	8.5	18	32.6	323	39.8	21	34.6	0.95798	1.29723	5.10	0.7072
29	0.0801	0.216	0.010	278	32.7	18	34.2	322	40.1	21	30.7	0.95696	1.29659	5.21	0.7166
30	0.0828	+0.226	-0.008	279	3.7	18	36.3	321	40.3	21	26.7	0.95627	1.29594	-5.32	-0.7257
31	0.0856	0.236	-0.003	279	39.5	18	38.6	320	40.3	21	22.7	0.95636	1.29530	5.43	0.7345
Feb. 1	0.0883	0.246	+0.002	280	16.5	18	41.1	319	40.1	21	18.7	0.95748	1.29464	5.53	0.7430
2	0.0910	0.255	0.008	280	51.3	18	43.4	318	39.7	21	14.6	0.95961	1.29398	5.64	0.7511
h (9.0) 3	0.0938	0.265	0.012	281	21.5	18	45.4	317	39.2	21	10.6	0.96249	1.29333	5.74	0.7590
4	0.0965	+0.275	+0.014	281	45.2	18	47.0	316	38.5	21	6.6	0.96580	1.29266	-5.84	-0.7666
5	0.0992	0.284	0.014	282	2.5	18	48.2	315	37.7	21	2.5	0.96920	1.29200	5.94	0.7740
6	0.1020	0.293	0.012	282	13.7	18	48.9	314	36.7	20	58.4	0.97242	1.29134	6.04	0.7810
7	0.1047	0.302	0.007	282	20.3	18	49.4	313	35.5	20	54.4	0.97518	1.29068	6.14	0.7878
8	0.1075	0.311	+0.001	282	24.0	18	49.6	312	34.2	20	50.3	0.97719	1.29002	6.23	0.7944
9	0.1102	+0.320	-0.005	282	27.3	18	49.8	311	32.7	20	46.2	0.97830	1.28936	-6.32	-0.8008
10	0.1129	0.329	0.012	282	32.6	18	50.2	310	31.0	20	42.1	0.97861	1.28870	6.41	0.8069
11	0.1157	0.338	0.017	282	42.2	18	50.8	309	29.2	20	38.0	0.97826	1.28805	6.50	0.8128
12	0.1184	0.346	0.019	282	58.3	18	51.9	308	27.2	20	33.8	0.97751	1.28740	6.58	0.8185
13	0.1212	0.355	0.019	283	22.0	18	53.5	307	25.1	20	29.7	0.97681	1.28676	6.67	0.8240
14	0.1239	+0.364	-0.015	283	52.9	18	55.5	306	22.8	20	25.5	0.97670	1.28613	-6.75	-0.8292
15	0.1266	+0.372	-0.008	284	27.7	18	57.9	305	20.4	20	21.4	0.97756	1.28550	-6.83	-0.8343

FOR WASHINGTON MEAN MIDNIGHT.

Star Day. Sidereal Hour.)	τ	f	f'	G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	$^{\circ}$	$'$ h m	$^{\circ}$	$'$ h m			$''$	
b. 15	0.1266	+0.372	-0.008	284	27.7 18 57.9	305	20.4 20 21.4	0.97756	1.28550	6.83	-0.8343
16	0.1294	0.380	0.000	285	2.8 19 0.2	304	17.8 20 17.2	0.97961	1.28488	6.91	0.8392
17	0.1321	0.388	+0.007	285	34.1 19 2.3	303	15.1 20 13.0	0.98272	1.28427	6.98	0.8439
h 18	0.1348	0.397	0.012	285	57.9 19 3.9	302	12.2 20 8.8	0.98652	1.28367	7.05	0.8484
l.0) 19	0.1376	0.405	0.014	286	13.1 19 4.9	301	9.2 20 4.6	0.99041	1.28308	7.12	0.8527
20	0.1403	+0.412	+0.013	286	20.2 19 5.4	300	6.1 20 0.4	0.99377	1.28250	7.19	-0.8569
21	0.1431	0.420	0.008	286	22.4 19 5.5	299	2.8 19 56.2	0.99616	1.28194	7.26	0.8608
22	0.1458	0.428	+0.002	286	23.3 19 5.5	297	59.4 19 52.0	0.99738	1.28139	7.32	0.8646
23	0.1485	0.435	-0.004	286	26.8 19 5.8	296	55.8 19 47.7	0.99752	1.28085	7.38	0.8683
24	0.1513	0.443	0.008	286	36.2 19 6.4	295	52.1 19 43.5	0.99685	1.28032	7.44	0.8718
25	0.1540	+0.451	-0.010	286	52.7 19 7.5	294	48.3 19 39.2	0.99593	1.27982	7.50	-0.8751
26	0.1568	0.458	0.009	287	15.9 19 9.1	293	44.4 19 35.0	0.99525	1.27932	7.56	0.8782
27	0.1595	0.465	-0.004	287	43.5 19 10.9	292	40.3 19 30.7	0.99512	1.27885	7.61	0.8812
28	0.1622	0.473	+0.001	288	12.3 19 12.8	291	36.2 19 26.4	0.99588	1.27839	7.66	0.8840
r. 1	0.1650	0.480	0.007	288	39.0 19 14.6	290	31.9 19 22.1	0.99762	1.27795	7.70	0.8867
2	0.1677	+0.488	+0.012	289	1.2 19 16.1	289	27.5 19 17.8	1.00006	1.27753	7.75	-0.8893
3	0.1704	0.495	0.015	289	17.7 19 17.2	288	23.1 19 13.5	1.00285	1.27713	7.79	0.8916
4	0.1732	0.503	0.015	289	27.9 19 17.9	287	18.5 19 9.2	1.00568	1.27674	7.83	0.8939
5	0.1759	0.510	0.014	289	33.0 19 18.2	286	13.9 19 4.9	1.00828	1.27638	7.87	0.8960
h 6	0.1786	0.516	0.010	289	34.2 19 18.3	285	9.2 19 0.6	1.01039	1.27604	7.90	0.8979
l.0) 7	0.1814	+0.523	+0.004	289	33.3 19 18.2	284	4.4 18 56.3	1.01183	1.27572	7.94	-0.8998
8	0.1841	0.530	-0.003	289	32.3 19 18.2	282	59.6 18 52.0	1.01252	1.27542	7.97	0.9014
9	0.1869	0.537	0.009	289	33.2 19 18.2	281	54.7 18 47.6	1.01247	1.27515	8.00	0.9030
10	0.1896	0.544	0.015	289	38.2 19 18.5	280	49.8 18 43.3	1.01178	1.27490	8.02	0.9044
11	0.1923	0.550	0.018	289	49.3 19 19.3	279	44.9 18 39.0	1.01070	1.27466	8.05	0.9056
12	0.1951	+0.557	-0.019	290	7.2 19 20.5	278	39.9 18 34.7	1.00961	1.27446	8.07	-0.9068
13	0.1978	0.564	0.016	290	31.6 19 22.1	277	34.9 18 30.3	1.00896	1.27428	8.09	0.9077
14	0.2006	0.571	0.010	291	0.1 19 24.0	276	29.9 18 26.0	1.00917	1.27412	8.10	0.9086
15	0.2033	0.578	-0.003	291	29.0 19 25.9	275	24.9 18 21.7	1.01043	1.27398	8.12	0.9093
16	0.2060	0.585	+0.004	291	55.1 19 27.7	274	19.9 18 17.3	1.01265	1.27388	8.13	0.9099
17	0.2088	+0.592	+0.010	292	15.1 19 29.0	273	14.9 18 13.0	1.01555	1.27379	8.14	-0.9104
18	0.2115	0.599	0.013	292	27.7 19 29.9	272	10.0 18 8.7	1.01865	1.27373	8.14	0.9107
19	0.2142	0.605	0.013	292	33.0 19 30.2	271	5.0 18 4.3	1.02135	1.27369	8.14	0.9109
20	0.2170	0.612	0.009	292	33.4 19 30.2	270	0.0 18 0.0	1.02325	1.27368	8.15	0.9110
h 21	0.2197	0.618	+0.003	292	32.6 19 30.2	268	55.2 17 55.7	1.02412	1.27369	8.14	0.9109
l.0) 22	0.2225	+0.625	-0.003	292	34.7 19 30.3	267	50.4 17 51.4	1.02390	1.27373	8.14	-0.9107
23	0.2252	0.632	0.008	292	42.5 19 30.8	266	45.6 17 47.0	1.02282	1.27379	8.14	0.9104
24	0.2279	0.639	0.011	292	57.2 19 31.8	265	40.9 17 42.7	1.02142	1.27387	8.13	0.9099
25	0.2307	0.646	0.010	293	18.7 19 33.2	264	36.2 17 38.4	1.02017	1.27398	8.12	0.9093
26	0.2334	0.652	0.006	293	45.3 19 35.0	263	31.6 17 34.1	1.01948	1.27412	8.10	0.9086
27	0.2362	+0.659	-0.001	294	13.7 19 36.9	262	27.1 17 29.8	1.01967	1.27427	8.09	-0.9078
28	0.2389	0.666	+0.005	294	40.6 19 38.7	261	22.7 17 25.5	1.02067	1.27445	8.07	0.9068
29	0.2416	0.673	0.011	295	3.1 19 40.2	260	18.4 17 21.2	1.02236	1.27466	8.05	0.9057
30	0.2444	0.680	0.014	295	19.9 19 41.3	259	14.1 17 16.9	1.02450	1.27488	8.02	0.9044
31	0.2471	0.686	0.016	295	31.0 19 42.1	258	10.0 17 12.7	1.02674	1.27513	8.00	0.9031
r. 1	0.2498	+0.693	+0.015	295	37.3 19 42.5	257	5.9 17 8.4	1.02872	1.27540	7.97	-0.9016
2	0.2526	+0.701	+0.011	295	39.9 19 42.7	256	2.0 17 4.1	1.03024	1.27569	7.94	-0.8999

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f'	G		H		Log g .	Log h .	i	Log i .	
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
	y	s	s	°	'	°	'			"		
Apr. 1	0.2498	+0.693	+0.015	295	37.3	257	5.9	17 8.4	1.02872	1.27540	-7.97	-0.9016
2	0.2526	0.701	0.011	295	39.9	256	2.0	17 4.1	1.03024	1.27569	7.94	0.8999
3	0.2553	0.708	+0.006	295	40.5	254	58.2	16 59.9	1.03113	1.27600	7.91	0.8982
4	0.2580	0.715	0.000	295	41.0	253	54.6	16 55.6	1.03134	1.27634	7.88	0.8963
h 5	0.2608	0.722	-0.007	295	43.8	252	51.0	16 51.4	1.03089	1.27669	7.84	0.8942
(18.0) 6	0.2635	+0.729	-0.013	295	51.0	251	47.6	16 47.2	1.02986	1.27706	-7.80	-0.8920
7	0.2663	0.736	0.017	296	3.6	250	44.4	16 43.0	1.02845	1.27745	7.76	0.8897
8	0.2690	0.743	0.018	296	22.9	249	41.3	16 38.8	1.02702	1.27786	7.71	0.8873
9	0.2717	0.750	0.016	296	48.1	248	38.4	16 34.6	1.02602	1.27829	7.67	0.8847
10	0.2745	0.757	0.012	297	17.7	247	35.6	16 30.4	1.02580	1.27873	7.62	0.8819
11	0.2772	+0.765	-0.005	297	48.3	246	33.0	16 26.2	1.02653	1.27919	-7.57	-0.8790
12	0.2800	0.772	+0.003	298	16.7	245	30.6	16 22.0	1.02822	1.27967	7.52	0.8760
13	0.2827	0.780	0.009	298	39.2	244	28.4	16 17.9	1.03063	1.28016	7.46	0.8728
14	0.2854	0.788	0.012	298	53.9	243	26.3	16 13.8	1.03333	1.28067	7.40	0.8695
15	0.2882	0.795	0.013	299	2.3	242	24.4	16 9.6	1.03579	1.28118	7.34	0.8660
16	0.2909	+0.803	+0.010	299	5.9	241	22.8	16 5.5	1.03747	1.28172	-7.28	-0.8624
17	0.2936	0.811	+0.004	299	7.5	240	21.3	16 1.4	1.03812	1.28226	7.22	0.8586
18	0.2964	0.819	-0.003	299	12.0	239	20.0	15 57.3	1.03779	1.28281	7.16	0.8547
19	0.2991	0.827	0.008	299	22.7	238	18.9	15 53.3	1.03667	1.28338	7.09	0.8506
h 20	0.3019	0.835	0.011	299	40.4	237	18.0	15 49.2	1.03525	1.28395	7.02	0.8463
(14.0) 21	0.3046	+0.844	-0.012	300	5.5	236	17.3	15 45.2	1.03396	1.28454	-6.95	-0.8418
22	0.3073	0.852	0.009	300	36.1	235	16.8	15 41.1	1.03320	1.28513	6.88	0.8372
23	0.3101	0.859	-0.003	301	8.1	234	16.4	15 37.1	1.03329	1.28573	6.80	0.8325
24	0.3128	0.867	+0.003	301	38.8	233	16.3	15 33.1	1.03427	1.28634	6.72	0.8275
25	0.3156	0.875	0.009	302	6.0	232	16.4	15 29.1	1.03593	1.28695	6.64	0.8224
26	0.3183	+0.884	+0.014	302	27.3	231	16.6	15 25.1	1.03801	1.28757	-6.56	-0.8170
27	0.3210	0.893	0.016	302	42.7	230	17.1	15 21.1	1.04020	1.28819	6.48	0.8115
28	0.3238	0.901	0.016	302	52.8	229	17.8	15 17.1	1.04220	1.28882	6.40	0.8058
29	0.3265	0.910	0.013	302	58.9	228	18.6	15 13.2	1.04382	1.28945	6.31	0.7999
30	0.3292	0.919	0.008	303	3.6	227	19.7	15 9.3	1.04486	1.29008	6.22	0.7938
May 1	0.3320	+0.928	+0.002	303	8.5	226	20.9	15 5.4	1.04522	1.29072	-6.13	-0.7875
2	0.3347	0.938	-0.005	303	15.7	225	22.4	15 1.5	1.04497	1.29135	6.04	0.7809
3	0.3374	0.947	0.011	303	26.9	224	24.0	14 57.6	1.04421	1.29198	5.94	0.7742
4	0.3402	0.955	0.015	303	43.5	223	25.9	14 53.7	1.04316	1.29262	5.85	0.7672
5	0.3429	0.964	0.017	304	6.3	222	27.9	14 49.9	1.04214	1.29325	5.75	0.7599
h 6	0.3457	+0.974	-0.016	304	35.1	221	30.1	14 46.0	1.04153	1.29388	-5.66	-0.7524
(15.0) 7	0.3484	0.983	0.013	305	7.7	220	32.6	14 42.2	1.04161	1.29450	5.56	0.7447
8	0.3511	0.992	-0.006	305	41.3	219	35.2	14 38.4	1.04265	1.29513	5.45	0.7367
9	0.3539	1.002	+0.001	306	12.5	218	38.0	14 34.5	1.04463	1.29575	5.35	0.7284
10	0.3566	1.012	0.008	306	37.9	217	41.0	14 30.7	1.04734	1.29636	5.25	0.7199
11	0.3594	+1.022	+0.012	306	56.1	216	44.2	14 26.9	1.05036	1.29697	-5.14	-0.7110
12	0.3621	1.032	0.014	307	7.1	215	47.6	14 23.2	1.05315	1.29757	5.03	0.7019
13	0.3648	1.042	0.011	307	13.3	214	51.2	14 19.4	1.05528	1.29817	4.92	0.6924
14	0.3676	1.052	+0.006	307	17.6	213	54.9	14 15.7	1.05655	1.29876	4.82	0.6826
15	0.3703	1.062	-0.001	307	24.3	212	58.8	14 11.9	1.05682	1.29934	4.70	0.6725
16	0.3730	+1.072	-0.007	307	36.2	212	2.9	14 8.2	1.05640	1.29991	-4.59	-0.6620
17	0.3758	+1.082	-0.011	307	55.5	211	7.2	14 4.5	1.05562	1.30047	-4.48	-0.6511

FOR WASHINGTON MEAN MIDNIGHT.

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)	τ	f	f'	G		H		Log g .	Log h .	i	Log i .
		In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	s	s	$^{\circ}$ $'$	h m	$^{\circ}$ $'$	h m			"	
ug. 16	0.6249	+2.065	+0.014	325 33.4	21 42.2	128 42.3	8 34.8	1.21602	1.28756	+6.56	+0.8171
17	0.6277	2.074	0.009	325 27.8	21 41.8	127 43.2	8 30.9	1.21731	1.28695	6.64	0.8224
18	0.6304	2.082	+0.004	325 23.5	21 41.6	126 43.9	8 26.9	1.21816	1.28634	6.72	0.8275
19	0.6331	2.091	-0.004	325 21.5	21 41.4	125 44.5	8 23.0	1.21867	1.28574	6.80	0.8324
20	0.6359	2.099	0.010	325 22.7	21 41.5	124 44.8	8 19.0	1.21894	1.28515	6.87	0.8371
h 1.0) 21	0.6386	+2.106	-0.015	325 27.6	21 41.9	123 44.9	8 15.0	1.21912	1.28456	+6.94	+0.8417
22	0.6414	2.114	0.018	325 35.8	21 42.4	122 44.9	8 11.0	1.21945	1.28398	7.02	0.8461
23	0.6441	2.122	0.018	325 46.6	21 43.1	121 44.7	8 7.0	1.22012	1.28341	7.08	0.8503
24	0.6468	2.130	0.016	325 59.3	21 44.0	120 44.3	8 3.0	1.22126	1.28285	7.15	0.8544
25	0.6496	2.138	0.010	326 11.7	21 44.8	119 43.7	7 58.9	1.22294	1.28230	7.22	0.8583
26	0.6523	+2.146	-0.003	326 21.5	21 45.4	118 42.9	7 54.8	1.22516	1.28177	+7.28	+0.8620
27	0.6550	2.154	+0.004	326 27.2	21 45.8	117 42.0	7 50.8	1.22769	1.28124	7.34	0.8656
28	0.6578	2.161	0.010	326 28.1	21 45.9	116 40.9	7 46.7	1.23028	1.28072	7.40	0.8691
29	0.6605	2.169	0.013	326 25.1	21 45.7	115 39.6	7 42.6	1.23261	1.28022	7.45	0.8724
30	0.6633	2.177	0.012	326 19.3	21 45.3	114 38.1	7 38.6	1.23449	1.27974	7.51	0.8756
31	0.6660	+2.185	+0.008	326 13.0	21 44.9	113 36.4	7 34.4	1.23575	1.27926	+7.56	+0.8786
pt. 1	0.6687	2.192	+0.002	326 9.0	21 44.6	112 34.6	7 30.3	1.23640	1.27881	7.61	0.8815
2	0.6715	2.200	-0.004	326 9.3	21 44.6	111 32.6	7 26.2	1.23660	1.27836	7.66	0.8842
3	0.6742	2.207	0.009	326 14.8	21 45.0	110 30.5	7 22.0	1.23659	1.27794	7.70	0.8868
h 4	0.6770	2.214	0.011	326 24.7	21 45.6	109 28.3	7 17.9	1.23674	1.27753	7.75	0.8892
1.0) 5	0.6797	+2.221	-0.010	326 37.7	21 46.5	108 25.9	7 13.7	1.23726	1.27714	+7.79	+0.8916
6	0.6824	2.227	-0.006	326 51.4	21 47.4	107 23.3	7 9.6	1.23830	1.27677	7.83	0.8937
7	0.6852	2.234	0.000	327 3.5	21 48.2	106 20.7	7 5.4	1.23986	1.27642	7.87	0.8958
8	0.6879	2.241	+0.007	327 12.4	21 48.8	105 17.9	7 1.2	1.24179	1.27608	7.90	0.8977
9	0.6906	2.249	0.012	327 17.0	21 49.1	104 14.9	6 57.0	1.24385	1.27577	7.93	0.8995
10	0.6934	+2.256	+0.016	327 17.5	21 49.2	103 11.9	6 52.8	1.24581	1.27548	+7.96	+0.9011
11	0.6961	2.263	0.017	327 14.8	21 49.0	102 8.8	6 48.6	1.24756	1.27520	7.99	0.9026
12	0.6988	2.270	0.015	327 10.4	21 48.7	101 5.5	6 44.4	1.24891	1.27495	8.02	0.9040
13	0.7016	2.277	0.011	327 5.6	21 48.4	100 2.2	6 40.1	1.24985	1.27472	8.04	0.9053
14	0.7043	2.283	+0.006	327 1.8	21 48.1	98 58.7	6 35.9	1.25038	1.27452	8.06	0.9064
15	0.7071	+2.290	-0.001	327 0.0	21 48.0	97 55.2	6 31.7	1.25057	1.27433	+8.08	+0.9074
16	0.7098	2.297	0.007	327 1.0	21 48.1	96 51.6	6 27.4	1.25055	1.27417	8.10	0.9083
17	0.7125	2.304	0.013	327 5.4	21 48.4	95 47.9	6 23.2	1.25042	1.27403	8.11	0.9091
18	0.7153	2.311	0.017	327 13.3	21 48.9	94 44.1	6 18.9	1.25034	1.27391	8.12	0.9097
19	0.7180	2.317	0.018	327 24.3	21 49.6	93 40.2	6 14.7	1.25050	1.27382	8.13	0.9102
20	0.7208	+2.323	-0.016	327 37.0	21 50.5	92 36.3	6 10.4	1.25108	1.27375	+8.14	+0.9106
1.0) 21	0.7235	2.330	0.012	327 49.7	21 51.3	91 32.3	6 6.2	1.25217	1.27370	8.14	0.9108
22	0.7262	2.336	-0.005	328 0.6	21 52.0	90 28.3	6 1.9	1.25373	1.27368	8.15	0.9109
23	0.7290	2.343	+0.002	328 8.2	21 52.5	89 24.3	5 57.6	1.25568	1.27368	8.15	0.9109
24	0.7317	2.350	0.008	328 11.5	21 52.8	88 20.2	5 53.3	1.25776	1.27371	8.14	0.9108
25	0.7344	+2.357	+0.011	328 10.8	21 52.7	87 16.0	5 49.1	1.25971	1.27376	+8.14	+0.9105
26	0.7372	2.364	0.012	328 7.1	21 52.5	86 11.9	5 44.8	1.26129	1.27383	8.13	0.9102
27	0.7399	2.371	0.009	328 2.7	21 52.2	85 7.7	5 40.5	1.26232	1.27393	8.12	0.9096
28	0.7427	2.378	+0.003	328 0.0	21 52.0	84 3.5	5 36.2	1.26279	1.27405	8.11	0.9090
29	0.7454	2.384	-0.003	328 1.2	21 52.1	82 59.3	5 32.0	1.26280	1.27419	8.10	0.9082
30	0.7481	+2.391	-0.009	328 7.0	21 52.5	81 55.1	5 27.7	1.26259	1.27436	+8.08	+0.9073
st. 1	0.7509	+2.398	-0.012	328 17.5	21 53.2	80 50.9	5 23.4	1.26243	1.27455	+8.06	+0.9063

FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sidereal Hour.)		τ	f	f'	G		H		Log g .	Log h .	i	Log i .
			In Time.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
		y	s	s	° '	h m	° '	h m			"	
Oct.	1	0.7509	+2.398	-0.012	328 17.5	21 53.2	80 50.9	5 23.4	1.26243	1.27455	+8.06	+0.9063
	2	0.7536	2.405	0.011	328 31.5	21 54.1	79 46.9	5 19.1	1.26263	1.27476	8.04	0.9051
	3	0.7564	2.412	0.008	328 47.0	21 55.1	78 42.8	5 14.8	1.26330	1.27500	8.01	0.9038
	4	0.7591	2.419	-0.002	329 1.6	21 56.1	77 38.7	5 10.6	1.26448	1.27526	7.99	0.9024
	5	0.7618	2.425	+0.005	329 13.3	21 56.9	76 34.7	5 6.3	1.26605	1.27554	7.96	0.9008
	6	0.7646	+2.432	+0.011	329 21.2	21 57.4	75 30.8	5 2.1	1.26781	1.27584	+7.93	+0.8991
	7	0.7673	2.439	0.016	329 25.2	21 57.7	74 26.9	4 57.8	1.26957	1.27616	7.89	0.8972
	8	0.7700	2.446	0.018	329 25.7	21 57.7	73 23.1	4 53.5	1.27114	1.27651	7.86	0.8953
	9	0.7728	2.453	0.017	329 24.2	21 57.6	72 19.3	4 49.3	1.27234	1.27687	7.82	0.8931
	10	0.7755	2.461	0.013	329 22.1	21 57.5	71 15.6	4 45.0	1.27316	1.27726	7.78	0.8909
	11	0.7782	+2.468	+0.008	329 20.8	21 57.4	70 12.0	4 40.8	1.27362	1.27766	+7.74	+0.8885
	12	0.7810	2.475	+0.002	329 21.3	21 57.4	69 8.5	4 36.6	1.27372	1.27808	7.69	0.8859
	13	0.7837	2.482	-0.005	329 24.4	21 57.6	68 5.1	4 32.3	1.27361	1.27852	7.64	0.8832
	14	0.7865	2.490	0.011	329 30.8	21 58.1	67 1.8	4 28.1	1.27339	1.27898	7.59	0.8804
	15	0.7892	2.497	0.015	329 40.6	21 58.7	65 58.6	4 23.9	1.27321	1.27945	7.54	0.8774
h (1.0)	16	0.7919	+2.505	-0.017	329 53.3	21 59.6	64 55.5	4 19.7	1.27325	1.27994	+7.49	+0.8742
	17	0.7947	2.512	0.016	330 7.8	22 0.5	63 52.5	4 15.5	1.27368	1.28045	7.43	0.8709
	18	0.7974	2.520	0.013	330 22.5	22 1.5	62 49.6	4 11.3	1.27457	1.28097	7.37	0.8674
	19	0.8002	2.528	-0.007	330 36.0	22 2.4	61 46.8	4 7.1	1.27594	1.28151	7.31	0.8638
	20	0.8029	2.536	0.000	330 46.8	22 3.1	60 44.1	4 2.9	1.27769	1.28206	7.24	0.8600
	21	0.8056	+2.544	+0.006	330 53.5	22 3.6	59 41.5	3 58.8	1.27961	1.28262	+7.18	+0.8561
	22	0.8084	2.551	0.010	330 56.3	22 3.8	58 39.1	3 54.6	1.28147	1.28319	7.11	0.8519
	23	0.8111	2.559	0.012	330 56.0	22 3.7	57 36.8	3 50.5	1.28305	1.28378	7.04	0.8476
	24	0.8138	2.568	0.009	330 54.6	22 3.6	56 34.7	3 46.3	1.28415	1.28437	6.97	0.8431
	25	0.8166	2.576	+0.004	330 54.1	22 3.6	55 32.6	3 42.2	1.28473	1.28498	6.89	0.8385
	26	0.8193	+2.584	-0.002	330 56.5	22 3.8	54 30.7	3 38.0	1.28487	1.28559	+6.82	+0.8336
	27	0.8221	2.592	0.008	331 3.4	22 4.2	53 29.0	3 33.9	1.28478	1.28621	6.74	0.8286
	28	0.8248	2.601	0.012	331 15.0	22 5.0	52 27.4	3 29.8	1.28472	1.28684	6.66	0.8233
	29	0.8275	2.609	0.013	331 30.2	22 6.0	51 25.9	3 25.7	1.28494	1.28747	6.58	0.8179
	30	0.8303	2.617	0.010	331 47.5	22 7.2	50 24.6	3 21.6	1.28562	1.28812	6.49	0.8122
h (2.0)	31	0.8330	+2.626	-0.005	332 4.7	22 8.3	49 23.4	3 17.6	1.28683	1.28876	+6.40	+0.8064
	Nov. 1	0.8358	2.635	+0.002	332 19.5	22 9.3	48 22.4	3 13.5	1.28845	1.28941	6.31	0.8003
	2	0.8385	2.644	0.009	332 30.4	22 10.0	47 21.5	3 9.4	1.29032	1.29006	6.22	0.7940
	3	0.8412	2.653	0.014	332 37.3	22 10.5	46 20.8	3 5.4	1.29223	1.29072	6.13	0.7874
	4	0.8440	2.663	0.017	332 40.8	22 10.7	45 20.3	3 1.4	1.29397	1.29137	6.04	0.7807
	5	0.8467	+2.672	+0.018	332 42.0	22 10.8	44 19.9	2 57.3	1.29541	1.29203	+5.94	+0.7737
	6	0.8494	2.681	0.015	332 42.3	22 10.8	43 19.7	2 53.3	1.29648	1.29268	5.84	0.7664
	7	0.8522	2.690	0.010	332 43.0	22 10.9	42 19.6	2 49.3	1.29718	1.29334	5.74	0.7589
	8	0.8549	2.700	+0.004	332 45.1	22 11.0	41 19.7	2 45.3	1.29757	1.29399	5.64	0.7510
	9	0.8576	2.710	-0.003	332 49.6	22 11.3	40 19.9	2 41.3	1.29775	1.29464	5.53	0.7430
	10	0.8604	+2.719	-0.009	332 57.3	22 11.8	39 20.3	2 37.4	1.29783	1.29529	+5.43	+0.7346
	11	0.8631	2.729	0.014	333 7.9	22 12.5	38 20.8	2 33.4	1.29794	1.29593	5.32	0.7259
	12	0.8659	2.739	0.016	333 21.1	22 13.4	37 21.5	2 29.4	1.29827	1.29657	5.21	0.7169
	13	0.8686	2.749	0.016	333 36.1	22 14.4	36 22.3	2 25.5	1.29891	1.29720	5.10	0.7076
	14	0.8713	2.759	0.013	333 51.8	22 15.5	35 23.3	2 21.6	1.29998	1.29783	4.99	0.6979
	15	0.8741	+2.769	-0.008	334 6.5	22 16.4	34 24.4	2 17.6	1.30151	1.29845	+4.87	+0.6878
	16	0.8768	+2.779	-0.001	334 18.7	22 17.2	33 25.7	2 13.7	1.30340	1.29906	+4.76	+0.6774

FOR WASHINGTON MEAN MIDNIGHT.

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230 BESSELIAN AND INDEPENDENT STAR-NUMBERS, 1913.

FOR WASHINGTON SIDEREAL TWELVE HOURS.

Mean Solar Date.		Log A ₁ .	Log B ₁ .	Log C.	Log D.	f	G ₁	H	Log a ₁ .	Log h.	Log i.
						s	° ' "	° ' "			
Jan.	0.72	-8.5367	-0.9303	-0.5317	+1.3039	-0.106	265 22	350 24	0.9317	1.3100	-0.1690
	10.69	+7.6117	0.9360	0.8201	1.2824	+0.012	270 33	340 58	0.9360	1.3068	0.4574
	20.67	8.6069	0.9442	0.9825	1.2453	0.124	275 16	331 22	0.9460	1.3019	0.6198
	30.64	8.8695	0.9537	1.0897	1.1896	0.227	279 23	321 32	0.9595	1.2959	0.7270
Feb.	9.61	9.0190	0.9633	1.1642	1.1100	0.321	282 50	311 26	0.9743	1.2893	0.8015
	19.58	+9.1200	-0.9720	-1.2158	+0.9957	+0.405	285 44	301 4	0.9886	1.2830	-0.8531
Mar.	1.56	9.1946	0.9789	1.2496	0.8217	0.481	288 14	290 28	1.0013	1.2779	0.8869
	11.53	9.2538	0.9832	1.2684	+0.5019	0.551	290 30	279 43	1.0116	1.2747	0.9057
	21.50	9.3038	0.9846	1.2736	-9.5502	0.618	292 41	268 55	1.0196	1.2737	0.9109
	31.48	9.3489	0.9831	1.2658	0.5861	0.686	294 57	258 12	1.0257	1.2751	0.9031
Apr.	10.45	+9.3916	-0.9789	-1.2448	-0.8588	+0.757	297 24	247 39	1.0306	1.2787	-0.8821
	20.42	9.4336	0.9723	1.2094	1.0156	0.834	300 6	237 23	1.0353	1.2839	0.8466
	30.39	9.4754	0.9643	1.1572	1.1202	0.918	303 2	227 26	1.0410	1.2900	0.7945
May	10.37	9.5172	0.9558	1.0838	1.1939	1.011	306 8	217 49	1.0486	1.2963	0.7211
	20.34	9.5585	0.9477	0.9807	1.2459	1.112	309 17	208 30	1.0589	1.3020	0.6179
June	30.31	+9.5988	-0.9407	-0.8289	-1.2811	+1.220	312 21	199 27	1.0721	1.3066	-0.4662
	9.28	9.6373	0.9360	0.5732	1.3023	1.333	315 13	190 34	1.0881	1.3098	0.2106
	19.26	9.6737	0.9338	-9.8112	1.3109	1.449	317 46	181 49	1.1063	1.3111	-9.4484
	29.23	9.7074	0.9346	+0.3914	1.3074	1.566	319 55	173 5	1.1258	1.3105	+0.0287
July	9.20	9.7380	0.9381	0.7407	1.2916	1.681	321 40	164 18	1.1455	1.3082	0.3780
	19.18	+9.7656	-0.9439	+0.9241	-1.2627	+1.791	323 3	155 22	1.1649	1.3041	+0.5613
	29.15	9.7901	0.9515	1.0438	1.2186	1.895	324 7	146 14	1.1834	1.2988	0.6810
	8.12	9.8115	0.9597	1.1279	1.1557	1.991	324 56	136 50	1.2004	1.2928	0.7652
Aug.	18.09	9.8302	0.9677	1.1882	1.0674	2.079	325 36	127 8	1.2157	1.2866	0.8254
	28.07	9.8466	0.9746	1.2304	0.9398	2.158	326 11	117 8	1.2291	1.2810	0.8676
	7.04	+9.8611	-0.9798	+1.2576	-0.7382	+2.232	326 45	106 50	1.2408	1.2766	+0.8948
Sept.	17.01	9.8743	0.9825	1.2714	-0.3156	2.301	327 23	96 19	1.2509	1.2741	0.9087
	26.98	9.8867	0.9824	1.2726	+0.1508	2.368	328 8	85 41	1.2597	1.2739	0.9099
	6.96	9.8991	0.9793	1.2610	0.6882	2.436	329 2	75 2	1.2678	1.2760	0.8982
Oct.	16.93	9.9118	0.9737	1.2356	0.9146	2.508	330 5	64 28	1.2758	1.2802	0.8728
	26.90	+9.9253	-0.9657	+1.1943	+1.0540	+2.588	331 18	54 6	1.2843	1.2858	+0.8316
	5.88	9.9398	0.9562	1.1337	1.1495	2.676	332 37	43 57	1.2935	1.2923	0.7710
Nov.	15.85	9.9554	0.9463	1.0470	1.2169	2.773	333 58	34 4	1.3039	1.2987	0.6842
	25.82	9.9718	0.9371	0.9204	1.2636	2.880	335 16	24 24	1.3155	1.3042	0.5577
	5.79	9.9887	0.9298	0.7193	1.2935	2.994	336 28	14 56	1.3284	1.3084	0.3566
Dec.	15.76	+0.0058	-0.9252	+0.2976	+1.3087	+3.114	337 29	5 34	1.3422	1.3107	+9.9348
	25.74	0.0224	0.9240	-0.1273	1.3100	3.236	338 19	356 15	1.3563	1.3110	-9.7646
	35.71	+0.0384	-0.9263	-0.6652	+1.2975	+3.357	338 55	346 52	1.3705	1.3090	-0.3025

E=0°.000

The above numbers give the same reductions from mean to apparent place as are employed in computing the apparent places of the fixed stars, given on pages 287 to 486, from the mean places, given on pages 233 to 250. In order to render exact interpolation possible through intervals of ten days, all short period terms have been omitted.

TERMS OF SHORT PERIOD IN THE NUTATION, 1913. 231

FOR WASHINGTON MEAN MIDNIGHT.

232 TERMS OF SHORT PERIOD IN THE NUTATION, 1913.

FOR WASHINGTON MEAN MIDNIGHT.

Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$	Date.	$\delta''\psi$	$\delta''\omega$
	"	"		"	"		"	"		"	"
July 1	-0.18	-0.09	Aug. 16	+0.21	+0.04	Oct. 1	-0.19	+0.04	Nov. 16	-0.02	-0.11
2	-0.06	0.11	17	0.15	0.08	2	0.18	-0.01	17	+0.08	0.09
3	+0.06	0.10	18	+0.06	0.10	3	0.13	0.06	18	0.17	-0.05
4	0.17	0.07	19	-0.06	0.10	4	-0.03	0.10	19	0.20	0.00
5	0.23	-0.02	20	0.16	0.08	5	+0.08	0.11	20	0.18	+0.05
6	0.24	+0.04	21	0.25	0.05	6	0.18	0.10	21	+0.11	0.09
7	0.19	0.08	22	0.29	+0.01	7	0.25	0.07	22	0.00	0.11
8	+0.09	0.11	23	0.30	-0.03	8	0.29	-0.02	23	-0.11	0.10
9	-0.02	0.11	24	0.25	0.07	9	0.27	+0.02	24	0.19	0.07
10	0.12	0.08	25	0.16	0.10	10	0.22	0.06	25	0.23	+0.02
11	-0.18	+0.04	26	-0.05	-0.11	11	+0.13	+0.09	26	-0.20	-0.03
12	0.19	-0.01	27	+0.07	0.09	12	+0.03	0.10	27	0.13	0.08
13	0.14	0.06	28	0.16	-0.05	13	-0.08	0.09	28	-0.02	0.10
14	-0.06	0.09	29	0.21	0.00	14	0.18	0.07	29	+0.10	0.11
15	+0.05	0.11	30	0.20	+0.05	15	0.25	+0.04	30	0.20	0.09
16	0.14	0.10	31	0.14	0.09	16	0.28	-0.01	Dec. 1	0.27	0.05
17	0.22	0.07	Sept. 1	+0.04	0.11	17	0.26	0.05	2	0.29	-0.01
18	0.25	-0.03	2	-0.06	0.10	18	0.21	0.09	3	0.26	+0.04
19	0.24	+0.01	3	0.14	0.07	19	-0.11	0.11	4	0.19	0.07
20	0.20	0.05	4	0.18	+0.02	20	0.00	0.10	5	+0.10	0.09
21	+0.12	+0.08	5	-0.16	-0.03	21	+0.10	-0.08	6	-0.01	+0.10
22	+0.01	0.10	6	-0.10	0.08	22	0.17	-0.03	7	0.12	0.09
23	-0.10	0.10	7	0.00	0.10	23	0.19	+0.02	8	0.20	0.06
24	0.19	0.08	8	+0.11	0.11	24	0.15	0.07	9	0.25	+0.02
25	0.27	+0.04	9	0.20	0.09	25	+0.07	0.10	10	0.27	-0.02
26	0.30	0.00	10	0.26	0.05	26	-0.03	0.11	11	0.23	0.06
27	0.29	-0.05	11	0.28	-0.01	27	0.13	0.09	12	0.16	0.09
28	0.22	0.08	12	0.25	+0.03	28	0.20	+0.06	13	-0.05	0.11
29	-0.12	0.11	13	0.18	0.07	29	0.21	0.00	14	+0.06	0.10
30	0.00	0.10	14	+0.09	0.09	30	0.17	-0.05	15	0.16	0.06
31	+0.12	-0.08	15	-0.01	+0.10	31	-0.08	-0.09	16	+0.21	-0.02
Aug. 1	0.20	-0.04	16	0.12	0.09	Nov. 1	+0.03	0.11	17	0.21	+0.04
2	0.23	+0.02	17	0.21	0.07	2	0.14	0.10	18	0.15	0.08
3	0.20	0.07	18	0.27	+0.03	3	0.23	0.08	19	+0.05	0.11
4	0.12	0.10	19	0.29	-0.02	4	0.28	-0.04	20	-0.06	0.11
5	+0.02	0.11	20	0.26	0.06	5	0.29	+0.01	21	0.16	0.08
6	-0.09	0.10	21	0.19	0.09	6	0.24	0.05	22	0.22	+0.04
7	0.16	+0.06	22	-0.09	0.11	7	0.17	0.08	23	0.22	-0.02
8	0.18	0.00	23	+0.03	0.10	8	+0.07	0.10	24	0.16	0.06
9	0.15	-0.05	24	0.12	0.07	9	-0.04	0.10	25	-0.07	0.10
10	-0.08	-0.09	25	+0.18	-0.02	10	-0.14	+0.08	26	+0.05	-0.11
11	+0.03	0.11	26	0.19	+0.04	11	0.22	0.05	27	0.16	0.10
12	0.13	0.10	27	0.14	0.08	12	0.26	+0.01	28	0.24	0.06
13	0.21	0.08	28	+0.05	0.11	13	0.26	-0.04	29	0.28	-0.02
14	0.26	-0.04	29	-0.05	0.11	14	0.22	0.08	30	0.26	+0.02
15	0.26	0.00	30	0.14	0.08	15	0.13	0.10	31	0.21	0.06
16	+0.21	+0.04	Oct. 1	-0.19	+0.04	16	-0.02	-0.11	32	+0.12	+0.09

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
33 Piscium	4.7	0	0	52.969	+ 3.0715	- 6	11	39.31	+20.136
α Andromedæ (<i>Alpheratz</i>)	2.2	0	3	53.258	3.0957	+28	36	36.47	19.880
β Cassiopeiæ	2.4	0	4	31.687	3.1840	+58	40	11.83	19.861
ε Phœnicis	3.9	0	4	59.884	3.0518	-46	13	39.11	19.848
22 Andromedæ	5.1	0	5	47.680	3.1091	+45	35	17.31	20.035
γ Pegasi	2.9	0	8	45.248	+ 3.0862	+14	41	59.77	+20.021
σ Andromedæ	4.5	0	13	46.740	3.1271	+36	18	10.48	19.963
ι Ceti	3.8	0	14	59.731	3.0570	- 9	18	22.07	19.973
ζ Tucanæ	4.3	0	15	32.892	3.1491	-65	23	8.63	21.172
44 Piscium	6.0	0	20	56.538	3.0743	+ 1	27	28.44	19.939
β Hydri	2.9	0	21	11.823	+ 3.2029	-77	44	39.20	+20.278
α Phœnicis	2.4	0	21	59.227	2.9729	-42	46	42.40	19.551
12 Ceti	6.0	0	25	35.947	3.0621	- 4	26	16.33	19.920
13 Ceti †	5.2	0	30	46.167	3.0871	- 4	4	17.72	19.848
ζ Cassiopeiæ	3.7	0	32	7.076	3.3278	+53	25	5.71	19.842
π Andromedæ	4.4	0	32	13.829	+ 3.1972	+33	14	26.07	+19.848
ε Andromedæ	4.5	0	33	57.295	3.1640	+28	50	22.26	19.572
δ Andromedæ	3.5	0	34	40.340	3.2017	+30	23	5.70	19.720
α Cassiop. (<i>Schedir</i>) †	var.	0	35	33.725	3.3858	+56	3	37.32	19.773
μ Phœnicis	4.6	0	37	12.926	2.8398	-46	33	46.17	19.750
β Ceti	2.2	0	39	13.394	+ 3.0126	-18	27	50.02	+19.794
ο Cassiopeiæ	4.7	0	39	52.291	3.3306	+47	48	30.35	19.737
21 Cassiopeiæ	5.6	0	39	52.886	3.9026	+74	30	45.79	19.717
ζ Andromedæ	4.3	0	42	43.448	3.1744	+23	47	38.66	19.621
η Cassiopeiæ †	3.6	0	43	49.737	3.6123	+57	21	18.74	19.204
δ Piscium	4.6	0	44	10.031	+ 3.1100	+ 7	6	42.47	+19.630
λ Hydri	5.0	0	45	34.854	2.1018	-75	23	48.17	19.650
20 Ceti	4.9	0	48	33.619	3.0641	- 1	36	58.84	19.594
γ Cassiopeiæ	2.2	0	51	26.840	3.5965	+60	14	45.09	19.538
μ Andromedæ	3.9	0	51	55.175	3.3205	+38	1	39.55	19.564
α Sculptoris	4.4	0	54	24.808	+ 2.8907	-29	49	39.57	+19.471
43 H. Cephei	4.5	0	56	38.823	7.5880	+85	47	27.59	19.432
ε Piscium	4.4	0	58	25.585	3.1111	+ 7	25	19.06	19.424
β Phœnicis †	3.4	1	2	12.087	2.6801	-47	11	5.20	19.288
μ Cassiopeiæ	5.3	1	2	28.327	3.9685	+54	29	38.75	17.750
η Ceti	3.6	1	4	12.792	+ 3.0174	-10	38	35.20	+19.139
β Andromedæ	2.4	1	4	51.359	3.3502	+35	9	34.34	19.131
τ Piscium	4.7	1	6	51.902	3.2968	+29	37	40.88	19.170
ζ Piscium †	5.6	1	9	11.070	3.1317	+ 7	6	56.03	19.087
κ Tucanæ †	5.0	1	12	49.151	2.0399	-69	20	17.78	19.131
f Piscium	5.3	1	13	18.618	+ 3.0924	+ 3	9	23.65	+19.003
υ Piscium	4.7	1	14	40.856	3.2903	+26	48	25.45	18.983
θ Ceti	3.8	1	19	40.453	2.9977	- 8	37	55.19	18.632
δ Cassiopeiæ	2.8	1	20	6.841	3.8991	+59	47	1.10	18.797
γ Phœnicis	3.4	1	24	35.284	2.6080	-43	45	50.10	18.471
38 Cassiopeiæ	6.0	1	24	44.152	+ 4.4126	+69	49	2.48	+18.619
η Piscium	3.7	1	26	49.512	3.2056	+14	53	51.59	18.622
α Ursæ Min. (<i>Polaris</i>) †	2.1	1	28	19.01*	+28.0572	+88	50	29.36	+18.578

13 Ceti, dup. 5^m.5, 6^m.2, 0^{''}.3
α Cassiop., var. irreg. 2^m.2, 2^m.8
η Cassiop. comp. 7^m.6, 5^{''} s. pr.

β Phœnicis, dup. 4^m.1, 4^m.1, 1^{''}.
ζ Piscium, star 6^m.5, 24^{''} n.f.

κ Tucanæ, comp. 7^m, 6^{''} n.
α Ursæ Min. star 9^m, 18^{''} s. pr.

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
40 Cassiopeiæ . . .	5.5	1	31	32.375	+4.7295	+72	35	49.85	+18.466
υ Andromedæ . . .	4.2	1	31	41.107	3.5092	+40	58	14.55	18.086
π Piscium	5.6	1	32	29.044	3.1763	+11	41	48.48	18.470
υ Persei	3.8	1	32	38.686	3.6665	+48	11	16.04	18.310
α Eridani (<i>Achernar</i>)	0.6	1	34	28.506	2.2366	-57	40	42.96	18.326
ω Cassiopeiæ . . .	5.5	1	35	52.804	+4.3989	+67	36	12.57	+18.315
ν Piscium	4.7	1	36	54.138	3.1195	+ 5	2	51.83	18.284
φ Persei	4.2	1	38	11.986	3.7433	+50	15	3.25	18.218
τ Ceti	3.6	1	40	1.548	2.7865	-16	23	42.92	19.025
ο Piscium	4.5	1	40	47.856	3.1648	+ 8	43	12.74	18.183
ε Sculptoris . . . †	5.4	1	41	34.072	+2.8046	-25	29	13.04	+18.058
4 Octantis (G.) . .	5.6	1	42	17.46*	-3.8020	-85	12	33.92	18.110
ζ Ceti	3.9	1	47	9.943	+2.9600	-10	45	51.88	17.867
α Trianguli	3.6	1	48	7.092	3.4128	+29	9	19.64	17.625
ε Cassiopeiæ	3.4	1	48	7.349	4.2824	+63	14	31.86	17.842
ξ Piscium	4.8	1	49	3.008	+3.1036	+ 2	45	30.41	+17.840
β Arietis	2.7	1	49	49.824	3.3080	+20	22	59.35	17.677
ψ Phœnicis	4.4	1	50	9.387	2.4038	-46	43	43.53	17.670
υ Ceti	4.2	1	55	54.315	2.8258	-21	29	56.22	17.528
50 Cassiopeiæ . . .	4.1	1	55	58.782	5.0572	+72	0	3.32	17.553
α Hydri	3.0	1	56	1.317	+1.8819	-61	59	34.61	+17.558
γ Andromedæ <i>pr.</i> . .	2.3	1	58	33.178	3.6704	+41	54	45.99	17.373
γ Andromedæ <i>seq.</i> . .	5.1	Δα + 0.890			. . .	Δδ + 4.67			. . .
α Arietis	2.2	2	2	15.924	3.3757	+23	3	5.55	17.116
β Trianguli	3.1	2	4	21.720	3.5609	+34	34	34.52	17.122
55 Cassiopeiæ . . .	6.2	2	7	38.278	+4.6659	+66	7	2.24	+17.014
6 Persei	5.4	2	7	48.663	3.9723	+50	39	43.92	16.842
ξ ¹ Ceti	4.5	2	8	23.202	3.1767	+ 8	26	20.25	16.966
μ Fornacis	5.2	2	9	4.355	2.6379	-31	7	54.73	16.928
γ Trianguli	4.1	2	12	8.257	3.5578	+33	26	43.24	16.753
67 Ceti	5.7	2	12	38.571	+2.9905	- 6	49	21.69	+16.671
φ Eridani	3.8	2	13	23.991	2.1413	-51	54	52.73	16.716
ο Ceti (<i>Mira</i>) † <i>var.</i>		2	14	57.034	3.0290	- 3	22	19.57	16.441
κ Fornacis	5.4	2	18	33.667	2.7448	-24	12	40.94	16.415
δ Hydri	4.3	2	20	11.784	1.0578	-69	3	18.20	16.430
ι Cassiopeiæ . . . †	4.6	2	21	52.898	+4.9003	+67	0	43.19	+16.336
ξ ² Ceti	4.3	2	23	31.872	3.1862	+ 8	4	14.27	16.235
σ Ceti	4.8	2	27	57.750	2.8414	-15	37	33.07	15.909
36 H. Cassiopeiæ . .	5.3	2	29	44.075	5.6341	+72	26	19.00	15.935
ν Ceti	5.0	2	31	18.386	+3.1449	+ 5	12	51.12	15.815
μ Hydri	5.3	2	33	29.124	-1.3560	-79	29	20.83	+15.678
ν Arietis	5.4	2	33	52.400	+3.4016	+21	35	8.62	15.674
δ Ceti	4.0	2	35	1.315	3.0730	- 0	2	46.27	15.636
ε Hydri	4.3	2	38	14.807	0.9132	-68	38	22.58	15.459
θ Persei	4.2	2	38	15.027	4.0823	+48	51	40.32	15.366
γ Ceti <i>seq.</i> †	3.7	2	38	47.453	+3.1057	+ 2	52	10.89	+15.273
π Ceti	4.4	2	39	58.854	2.8537	-14	13	35.87	15.345
μ Ceti	4.4	2	40	14.196	+3.2391	+ 9	44	50.84	+15.318

ε Sculptoris, comp. 9^m, 5'' n. f.

ο Ceti, var., 331^d, 1^m.7-9^m.6, star 9^m f. 8^s

ι Cassiop., triple, 7^m, 8^m, 2'', 8''

γ Ceti, comp., 6^m.2, 2''.7 pr.

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
η Persei . . . †	3.9	2	44	20.514	+4.3562	+55	32	6.75	+15.097
41 Arietis . . .	3.7	2	44	51.533	3.5244	+26	54	9.31	14.968
β Fornacis . . .	4.5	2	45	26.968	2.5121	-32	46	15.34	15.201
σ Arietis . . .	5.5	2	46	41.196	3.3077	+14	43	26.58	14.939
τ ² Eridani . . .	4.8	2	47	5.453	2.7199	-21	21	43.32	14.933
τ Persei . . .	4.1	2	48	4.865	+4.2353	+52	24	25.92	+14.889
η Eridani . . .	4.0	2	52	10.608	2.9301	- 9	14	37.82	14.437
ε Arietis (mean) . . †	4.6	2	54	14.034	3.4250	+20	59	34.63	14.517
47 H. Cephei . . .	5.7	2	54	28.216	7.8391	+79	4	34.50	14.522
θ Eridani . . . †	3.4	2	54	57.857	2.2767	-40	39	10.35	14.507
α Ceti . . .	2.8	2	57	43.790	+3.1330	+ 3	44	56.38	+14.236
γ Persei . . .	3.1	2	58	29.224	4.3268	+53	9	59.72	14.264
τ ³ Eridani . . .	4.2	2	58	33.365	2.6448	-23	57	53.61	14.220
ρ Persei . . . †	var.	2	59	35.776	3.8346	+38	30	13.64	14.084
μ Horologii . . .	5.2	3	1	33.547	1.4074	-60	4	28.96	14.024
θ Hydri . . .	5.5	3	2	3.924	+0.0987	-72	14	31.93	+14.060
β Persei (Algol) †	var.	3	2	30.150	3.8927	+40	37	16.39	14.017
δ Arietis . . .	4.5	3	6	39.084	3.4258	+19	23	54.19	13.758
12 Eridani . . . †	4.0	3	8	22.468	2.5466	-29	19	46.56	14.283
48 H. Cephei . . .	5.5	3	9	14.359	7.4934	+77	24	59.34	13.537
ζ Arietis . . .	5.0	3	9	53.856	+3.4433	+20	43	21.42	+13.467
38 Horologii (G.) . . †	5.7	3	10	20.734	1.5145	-57	38	49.64	13.514
ζ Eridani . . .	4.9	3	11	36.379	2.9122	- 9	8	32.07	13.493
τ Arietis . . .	5.2	3	16	12.091	3.4590	+20	50	2.60	13.105
e Eridani . . .	4.3	3	16	27.164	+2.3980	-43	24	7.10	13.879
ι Hydri . . .	5.5	3	18	6.249	-1.5573	-77	42	23.89	+13.052
α Persei . . .	1.9	3	18	6.259	+4.2680	+49	33	8.55	12.984
ο Tauri . . .	3.8	3	20	7.762	3.2252	+ 8	43	24.15	12.803
2 H. Camelopardalis .	4.4	3	22	0.890	4.8356	+59	38	17.18	12.751
ε Tauri . . .	3.8	3	22	27.134	3.2482	+ 9	25	47.63	12.674
f Tauri . . .	4.3	3	26	4.068	+3.3088	+12	38	21.23	+12.476
ε Eridani . . . †	3.8	3	28	49.841	2.8251	- 9	45	7.42	12.310
τ ⁶ Eridani . . .	4.3	3	29	56.609	2.6482	-21	55	27.08	12.168
δ Persei . . .	3.1	3	36	43.465	4.2591	+47	30	36.93	11.695
δ Eridani . . .	3.7	3	39	4.802	2.8729	-10	3	26.71	12.294
ν Persei . . .	3.9	3	39	16.710	+4.0662	+42	18	16.78	+11.549
5 H. Camelopardalis .	4.7	3	41	9.325	6.2808	+71	3	55.17	11.358
η Tauri (Alcyone) †	3.0	3	42	18.596	3.5612	+23	50	12.62	11.282
τ ⁸ Eridani . . .	4.3	3	43	6.272	2.5806	-23	30	19.84	10.793
g Eridani . . .	4.2	3	46	11.944	+2.2451	-36	27	46.95	11.022
γ Hydri . . .	3.2	3	48	34.375	-0.9674	-74	30	20.92	+10.993
ζ Persei . . .	2.9	3	48	39.574	+3.7651	+31	37	33.85	10.855
9 H. Camelopardalis . †	5.2	3	49	42.558	5.0925	+60	51	18.09	10.775
ε Persei . . . †	3.0	3	52	0.709	4.0186	+39	45	33.88	10.595
ε Persei . . .	4.0	3	53	18.983	3.8863	+35	32	29.67	10.508
γ Eridani . . .	3.2	3	53	58.196	+2.7984	-13	45	19.36	+10.366
λ Tauri . . . †	var.	3	55	51.516	3.3213	+12	14	42.92	10.323
δ Reticuli . . .	4.4	3	57	21.805	+0.9405	-61	38	43.24	+10.220

η Persei, star 8^m.5, 28'' n. pr.
ε Arietis, dup., 5^m.2, 5^m.6, 1'' .2
θ Eridani, comp. 4^m.4, f. 8''
ρ Persei, var. irreg., 3^m.4-4^m.2

β Persei, var. 2^d.87, 2^m.1-3^m.2
12 Eridani, comp., 7^m, 1'' .4 n. pr.
38 Horologii remarkable pur-
plish red star.
ε Eridani, comp. 9^m, s. 7''

η Tauri, quad., comps. 6^m.3,
7^m.6, 8^m.2, 117'', 181'', 190''
9 H. Camelop., comp. 8^m, 1'' .9 n. f.
ε Persei, comp. 8^m, 8'' .6 n. f.
λ Tauri, var., 3^d.95, 3^m.3-4^m.2

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	'	"	"
ν Tauri	3.9	3	58	31.622	+ 3.1895	+ 5	44	55.03	+10.129
A Tauri †	4.5	3	59	32.966	3.5430	+21	50	42.00	9.999
c Persei	4.0	4	2	20.456	4.3464	+47	28	52.18	9.813
p Tauri	5.6	4	5	31.781	3.6488	+26	15	16.88	9.559
o ¹ Eridani	4.1	4	7	37.080	2.9272	- 7	3	49.33	9.526
Groombridge 750 . .	6.7	4	8	52.234	+17.5460	+85	19	32.98	+ 9.386
μ Tauri	4.3	4	10	48.522	3.2554	+ 8	40	30.76	9.169
α Horologii	3.8	4	11	7.122	1.9873	-42	30	31.44	8.939
α Reticuli	3.4	4	13	18.011	0.7646	-62	41	29.16	9.043
γ Tauri	3.9	4	14	50.431	3.4113	+15	25	5.94	8.853
δ Tauri	3.9	4	17	54.928	+ 3.4567	+17	20	21.32	+ 8.606
υ ⁵ Eridani	4.1	4	20	46.127	2.2528	-34	13	6.36	8.453
ε Tauri	3.6	4	23	32.083	+ 3.5005	+18	59	17.84	8.156
δ Mensæ	5.6	4	23	49.572	- 4.1531	-80	25	6.81	8.239
m Persei †	6.1	4	27	17.396	+ 4.2145	+42	52	44.47	7.894
α Tauri (Aldebaran)	1.1	4	30	55.598	+ 3.4398	+16	20	6.72	+ 7.407
ν Eridani	4.1	4	31	58.248	2.9956	- 3	31	46.43	7.512
α Doradus	3.5	4	32	6.930	1.2945	-55	13	28.81	7.489
53 Eridani	4.0	4	34	11.664	2.7454	-14	28	24.09	7.177
τ Tauri	4.3	4	37	1.298	3.5984	+22	47	27.06	7.081
Groombridge 848 . .	6.0	4	37	6.285	+ 8.0161	+75	47	4.45	+ 6.950
α Cœli	4.5	4	37	45.405	1.9299	-42	1	47.00	6.933
4 Camelopardalis . .	5.4	4	40	45.063	4.9858	+56	36	13.81	6.646
μ Eridani	4.2	4	41	9.096	2.9987	- 3	24	48.08	6.752
π ³ Orionis	3.3	4	45	6.961	3.2550	+ 6	48	36.96	6.457
9 Camelopardalis . .	4.4	4	45	23.645	+ 5.9468	+66	11	46.67	+ 6.416
i Tauri	5.1	4	46	16.980	3.5074	+18	41	33.44	6.302
π ⁶ Orionis	3.9	4	49	43.132	3.1239	+ 2	17	56.62	6.056
i Aurigæ	2.9	4	51	19.540	3.9036	+33	1	45.36	5.896
β Camelopardalis . .	4.2	4	55	40.373	5.3249	+60	18	58.98	5.541
ε Aurigæ †	var.	4	55	43.415	+ 4.3008	+43	41	44.02	+ 5.536
ζ Aurigæ	3.9	4	56	23.644	4.1892	+40	56	59.60	5.470
i Tauri	4.7	4	57	53.668	3.5845	+21	27	59.21	5.317
11 Orionis	4.6	4	59	35.797	3.4265	+15	17	1.59	5.187
η Aurigæ	3.3	5	0	24.709	4.2038	+41	7	4.04	5.082
ε Leporis	3.3	5	1	46.658	+ 2.5384	-22	29	14.10	+ 4.974
β Eridani	2.9	5	3	34.351	2.9491	- 5	11	53.24	4.812
μ Aurigæ	4.8	5	7	28.334	4.1014	+38	22	56.65	4.475
19 H. Camelopardalis .	5.2	5	8	11.849	9.8295	+79	8	0.75	4.648
μ Leporis	3.3	5	9	1.385	2.6939	-16	18	28.01	4.394
α Aurigæ (Capella)	0.2	5	10	15.591	+ 4.4284	+45	54	38.17	+ 3.888
β Orionis (Rigel) †	0.3	5	10	21.362	2.8822	- 8	18	5.04	4.308
λ Aurigæ	4.8	5	13	1.150	4.2174	+40	1	21.98	3.421
τ Orionis	3.7	5	13	22.901	2.9124	- 6	56	15.62	4.045
o Columbæ	4.9	5	14	20.657	2.1587	-34	58	47.79	3.615
γ Orionis (Bellatrix)	1.7	5	20	27.843	+ 3.2168	+ 6	16	17.91	+ 3.424
β Tauri	1.8	5	20	47.470	3.7911	+28	32	5.62	3.236
17 Camelopardalis . .	5.8	5	21	57.004	+ 5.6591	+62	59	45.05	+ 3.306

A Tauri, star 6^m.5 f. 38^s, 270'', s. | ε Aurigæ, var. irreg., 3^m.0-4^m.5. | β Orionis, comp. 8^m.0, 9''.5, s. pr.
m Persei, star 6^m.5, 115'', s. pr.

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
β Leporis . . .	3.0	5	24	31.059	+ 2.5702	-20	49	41.16	+3.002
χ Aurigæ . . .	4.9	5	27	3.855	3.9038	+32	7	42.94	2.858
δ Orionis . . . †	2.5	5	27	33.680	3.0642	- 0	21	45.96	2.825
Groombridge 966 . .	6.4	5	28	5.029	8.0074	+74	59	17.32	2.800
α Leporis . . .	2.7	5	28	53.574	2.6456	-17	53	2.07	2.712
φ ¹ Orionis . . .	4.5	5	30	2.608	+ 3.2925	+ 9	25	52.99	+2.597
ι Orionis . . . †	2.9	5	31	10.622	2.9341	- 5	57	58.68	2.512
ε Orionis . . .	1.8	5	31	47.901	3.0435	- 1	15	24.02	2.462
ζ Tauri . . .	3.0	5	32	26.680	3.5848	+21	5	24.95	2.372
Groombridge 944 . .	6.4	5	33	57.736	18.7532	+85	9	21.38	2.268
ζ Orionis . . . †	2.0	5	36	22.119	+ 3.0269	- 1	59	16.63	+2.049
α Columbæ . . .	2.8	5	36	29.919	2.1724	-34	7	12.02	2.014
ο Aurigæ . . .	5.5	5	39	9.527	4.6450	+49	47	21.25	1.802
ζ Leporis . . .	3.7	5	43	0.773	2.7178	-14	51	13.23	1.484
κ Orionis . . .	2.2	5	43	37.807	2.8448	- 9	41	59.33	1.427
δ Doradus . . .	4.5	5	44	36.904	+ 0.1020	-65	46	5.38	+1.344
ν Aurigæ . . .	4.2	5	45	27.569	+ 4.1572	+39	7	26.60	1.284
31 Mensæ (G.) . . .	6.2	5	47	1.50*	-11.6895	-84	49	51.91	1.220
δ Leporis . . .	3.9	5	47	34.765	+ 2.5796	-20	53	8.83	0.437
α Orionis (Betelgeux) †	var.	5	50	27.691	3.2478	+ 7	23	29.98	0.843
δ Aurigæ . . .	3.9	5	52	21.869	+ 4.9417	+54	16	45.53	+0.549
η Leporis . . .	3.8	5	52	26.532	2.7322	-14	10	58.44	0.802
β Aurigæ . . .	2.1	5	53	8.857	4.4017	+44	56	22.89	0.593
θ Aurigæ . . . †	2.7	5	53	47.318	4.0916	+37	12	26.80	+0.452
ι Geminorum . . .	4.3	5	58	49.915	3.6474	+23	16	7.90	-0.007
ι Puppis (G.) . . . †	6.2	6	1	58.179	+ 1.7257	-45	2	10.00	+0.053
ν Orionis . . .	4.4	6	2	36.305	3.4264	+14	46	46.84	-0.253
22 H. Camelopardalis .	4.7	6	9	15.751	6.6187	+69	21	7.24	0.924
η Geminorum . . . †	var.	6	9	37.608	3.6227	+22	31	58.39	0.858
2 Lyncis . . .	4.4	6	11	57.010	5.2987	+59	2	37.64	1.015
ζ Canis Majoris . . .	3.1	6	16	58.322	+ 2.3018	-30	1	27.97	-1.507
μ Geminorum . . .	3.2	6	17	41.863	3.6307	+22	33	32.99	1.661
ψ ¹ Aurigæ . . .	5.1	6	18	12.034	4.6261	+49	20	0.45	1.594
β Canis Majoris . . .	2.0	6	18	52.089	2.6415	-17	54	43.07	1.645
8 Monocerotis . . . †	4.5	6	19	9.504	3.1802	+ 4	38	16.24	1.665
α Argûs (Canopus) . .	-0.9	6	22	1.238	+ 1.3319	-52	38	52.37	-1.914
10 Monocerotis . . .	5.0	6	23	39.862	2.9641	- 4	42	27.26	2.060
ν Geminorum . . .	4.1	6	23	47.853	3.5629	+20	16	5.17	2.094
8 Lyncis . . .	6.0	6	29	44.636	5.4925	+61	33	32.38	2.870
23 H. Camelopardalis .	5.6	6	31	24.375	10.3020	+79	39	39.53	3.371
ξ ² Canis Majoris . . .	4.5	6	31	24.623	+ 2.5157	-22	53	41.01	-2.704
51 Aurigæ . . .	5.7	6	32	37.896	4.1598	+39	28	6.67	2.957
γ Geminorum . . .	1.9	6	32	41.195	3.4671	+16	28	27.70	2.897
ν Argûs . . .	3.2	6	35	6.036	1.8367	-43	7	9.24	3.077
S Monocerotis . . . †	4.7	6	36	11.226	3.3047	+ 9	58	37.19	3.160
ε Geminorum . . .	3.2	6	38	34.818	+ 3.6929	+25	13	5.50	-3.377
ξ Geminorum . . .	3.4	6	40	24.423	3.3685	+12	59	24.91	3.709
ψ ⁵ Aurigæ . . .	5.3	6	40	28.302	+ 4.3300	+43	39	54.20	-3.361

δ Orionis, star 6^m.9, 52''.6, n. .
ι Orionis, comp. 7^m.3, 11''.5, s.f.
ζ Orionis, comp. 4^m.2, 2''.4, s.f.

α Orionis, red star, var. irreg.
ι^m.0-ι^m.4.
θ Aurigæ, comp. 7^m.5, 2''.5, n. pr.
ι Puppis, star, 5^m.8, 150''. s. f.

η Gem., var. 231^d.4, 3^m.2-4^m.2,
comp. 8^m.6, 1''.2, n. pr.
8 Monoc., star, 6^m.5, 13''.7, n. f.
S Monoc., comp 8^m.8, 2''.9, s. pr.

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s	s	°	'	"	"
α Canis Majoris (<i>Sirius</i>) †	-1.6	6	41	18.860	+ 2.6435	-16	35	46.16	- 4.801
18 Monocerotis . . .	4.7	6	43	19.451	3.1281	+ 2	30	29.37	3.783
43 Camelopardalis . . .	5.1	6	44	19.896	6.4895	+68	59	27.66	3.841
θ Geminorum . . .	3.6	6	47	3.413	3.9583	+34	4	1.61	4.137
α Pictoris . . .	3.3	6	47	18.005	+ 0.6177	-61	50	52.42	3.870
ζ Mensæ . . .	5.6	6	47	18.312	- 4.9387	-80	43	22.11	- 4.026
τ Argûs . . .	2.8	6	47	46.631	+ 1.4884	-50	30	39.28	4.255
15 Lyncis . . . †	4.5	6	49	44.976	5.2075	+58	32	16.99	4.447
θ Canis Majoris . . .	4.2	6	50	8.896	2.7879	-11	55	43.78	4.359
ε Canis Majoris . . . †	1.6	6	55	12.387	2.3574	-28	51	10.95	4.779
ζ Geminorum . . . †	var.	6	58	57.005	+ 3.5607	+20	41	55.52	- 5.107
σ^2 Canis Majoris . . .	3.1	6	59	23.501	2.5048	-23	42	19.73	5.132
γ Canis Majoris . . .	4.1	6	59	49.361	2.7148	-15	30	14.52	5.183
51 H. Cephei . . .	5.3	7	0	7.12*	29.2898	+87	11	16.00	5.233
δ Canis Majoris . . .	2.0	7	4	51.179	2.4381	-26	15	15.97	5.594
63 Aurigæ . . .	5.1	7	5	40.459	+ 4.1331	+39	27	48.41	- 5.669
51 Geminorum . . .	5.3	7	8	22.625	+ 3.4482	+16	18	26.75	5.934
γ^2 Volantis . . . †	3.9	7	9	29.285	- 0.5005	-70	21	28.07	5.908
25 H. Camelopardalis . . .	5.1	7	12	50.993	+12.8361	+82	34	55.51	6.312
λ Geminorum . . .	3.6	7	13	5.670	3.4504	+16	41	53.17	6.330
π Argûs . . .	2.7	7	14	4.205	+ 2.1189	-36	56	27.42	- 6.376
δ Geminorum . . . †	3.5	7	14	55.739	+ 3.5866	+22	8	36.20	6.452
δ Volantis . . .	4.0	7	16	53.036	- 0.0189	-67	47	52.92	6.606
7 Octantis (G.) . . .	6.4	7	17	41.19*	-20.1724	-86	53	40.29	6.661
ι Geminorum . . .	3.9	7	20	19.517	+ 3.7306	+27	58	18.72	6.970
η Canis Majoris . . .	2.4	7	20	39.276	+ 2.3737	-29	7	57.97	- 6.903
Groombridge 1308 . . .	5.8	7	21	50.412	6.2767	+68	38	41.17	7.052
β Canis Minoris . . .	3.1	7	22	26.027	3.2555	+ 8	27	55.37	7.103
ρ Geminorum . . .	4.2	7	23	31.063	3.8633	+31	57	30.82	6.961
σ Argûs . . . †	3.3	7	26	28.193	1.9018	-43	7	29.25	7.205
α^2 Geminorum (<i>Castor</i>)	2.0	7	29	3.069	+ 3.8334	+32	4	49.81	- 7.676
α^1 Geminorum . . .	2.8	$\Delta\alpha$ - 0.272			. . .	$\Delta\delta$ - 4.12			. . .
25 Monocerotis . . .	5.2	7	32	57.136	2.9819	- 3	54	57.37	7.888
α Can. Min. . (<i>Procyon</i>) †	0.5	7	34	44.907	3.1422	+ 5	26	54.76	9.090
24 Lyncis . . .	5.0	7	35	39.203	5.0947	+58	54	54.27	8.182
κ Geminorum . . . †	3.7	7	39	11.869	+ 3.6267	+24	36	26.61	- 8.468
β Geminorum (<i>Pollux</i>)	1.2	7	39	59.666	3.6760	+28	14	13.77	8.526
4 Puppis . . .	5.1	7	41	56.508	2.7636	-14	21	6.05	8.628
ξ Argûs . . .	3.5	7	45	38.119	2.5232	-24	38	26.88	8.916
ϕ Geminorum . . .	5.0	7	48	10.529	3.6769	+26	59	30.75	9.140
26 Lyncis . . .	5.7	7	48	23.008	+ 4.3820	+47	47	27.97	- 9.136
Groombridge 1374 . . .	5.6	7	49	48.314	7.2478	+74	9	6.68	9.278
χ Argûs . . .	3.6	7	54	34.040	1.5260	-52	44	55.50	9.603
ω Cancrî . . .	5.9	7	55	40.139	3.6342	+25	37	54.27	9.697
χ Geminorum . . .	5.0	7	58	10.678	3.6906	+28	2	20.40	9.937
27 Lyncis . . .	4.9	8	1	55.277	+ 4.5308	+51	45	30.53	-10.171
ρ Argûs . . .	2.9	8	3	50.318	2.5546	-24	3	10.13	10.260
3 H. Ursæ Majoris . . .	5.5	8	4	10.194	+ 6.0144	+68	43	53.25	-10.332
15 Lyncis, dup., 4 ^m .9, 6 ^m .2, 0 ^{''} .7	γ^2 Volantis, comp. 5 ^m .8, 12 ^{''} .9,				δ Argûs, star. 8 ^m , 22 ^{''} .4, n. f.				
ε Can. Maj., comp. 9 ^m , 7 ^{''} .8, s. f.	n. pr.				κ Gem., comp. 8 ^m , 5, 6 ^{''} .6, s. pr.				
ζ Gem., var., 10 ^d .15, 3 ^m .7-4 ^m .3	δ Gem., comp. 8 ^m , 7 ^{''} .0, s. pr.								

Positions given for Sirius and Procyon are those of the centers of gravity of the systems. Corrections given on page ix remain to be applied to reduce to the positions of the stars.

[Eph 13]

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	Annual Variation.	Declination.			Annual Variation.
	"	"	"	"	"
1	1.8498	-47	4	47.56	-10.548
2	3.4447	+17	54	39.55	10.693
3	7.6259	+76	1	25.95	10.678
4	2.7580	-15	31	31.68	10.720
5	51.2112	+88	53	44.41	10.883
6	3.2558	+ 9	27	15.79	-10.955
7	4.1215	+43	28	5.23	11.373
8	3.4393	+18	36	43.99	11.413
9	1.2340	-59	13	45.38	11.542
10	2.9997	- 3	37	18.95	11.611
11	5.0137	+61	0	36.13	-11.827
12	1.7439	-77	12	15.38	11.713
13	3.9098	+38	18	55.99	12.191
14	3.4746	+20	44	14.54	12.097
15	6.7493	+73	56	5.86	12.325
16	3.1783	+ 6	0	28.05	-12.428
17	3.1384	+ 3	38	51.25	12.506
18	3.4772	+21	46	55.44	12.811
19	3.4141	+18	28	28.93	13.108
20	2.4110	-32	52	20.14	12.881
21	3.6383	+29	4	43.76	-13.032
22	3.1799	+ 6	44	19.29	13.079
23	1.6518	-54	23	21.91	13.138
24	3.6684	+30	54	34.52	13.496
25	3.1746	+ 6	16	38.18	13.587
26	4.1236	+48	23	2.27	-14.000
27	3.2848	+12	11	42.25	13.823
28	1.4682	-58	53	36.17	13.871
29	4.1116	+47	30	4.74	14.098
30	5.3248	+67	29	19.21	14.410
31	3.2529	+11	1	8.00	-14.374
32	2.1061	-43	4	51.88	14.474
33	8.0876	-85	18	58.68	14.708
34	3.1237	+ 2	40	54.90	15.082
35	0.6707	-69	21	31.56	14.818
36	3.3539	+18	4	28.99	-15.157
37	1.6041	-58	54	35.35	15.051
38	3.6640	+34	45	39.84	15.103
39	2.6513	-25	35	42.38	15.254
40	2.9487	- 8	16	51.38	15.508
41	4.7673	+63	26	34.74	-15.592
42	8.8162	+81	42	44.16	15.648
43	5.3635	+70	12	48.73	15.661
44	4.0315	+52	4	28.28	16.288
45	3.2371	+11	41	8.27	15.840
46	2.3592	-40	5	8.59	-15.718
47	3.6857	+36	47	4.04	15.865
48	1.6453	-80	33	1.95	-16.223

5, a. pr.
 Canceri, triple; binary 5^m.6,
 6^m.3, 1" with comp. 6^m.0,
 5" 4 a. f.
 Canceri, star 6^m.6, 30" 6, n. pr.

8 Hydræ, triple; binary 3^m.5,
 6^m.8, 0" 2, with comp. 7^m.8,
 3" 3
 8 Argûs, comp 5^m, 2", a.
 8 Canceri, dup. 5^m.9, 6^m.4, 1" 4

8¹ Carinæ, comp. 7^m.2, 5", f.
 8² Ura. Maj., binary 4^m.9, 8^m,
 1" 3
 8³ Argûs, dup. 3^m.8, 6^m.0, 0" 8

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation
		h	m	s		°	'	"	
o Leonis	3.8	9	36	30.550	+3.2052	+10	17	19.38	-16.277
θ Antliæ	5.0	9	40	19.388	2.6730	-27	22	14.61	16.408
ε Leonis	3.1	9	40	54.949	3.4113	+24	10	31.00	16.488
υ Ursæ Majoris . .	3.9	9	44	48.866	4.2937	+59	26	54.81	16.816
υ Argûs †	3.2	9	44	55.686	1.5009	-64	40	5.98	16.680
6 Sextantis	6.0	9	46	51.038	+3.0246	- 3	50	6.43	-16.785
μ Leonis	4.1	9	47	49.087	3.4175	+26	25	1.96	16.858
Groombridge 1586 . .	6.0	9	50	37.874	5.4349	+73	17	37.77	16.996
19 Leonis Minoris . .	5.2	9	52	21.658	3.6858	+41	28	13.82	17.039
φ Argûs	3.7	9	53	48.353	2.1014	-54	9	12.68	17.103
π Leonis	4.9	9	55	37.031	+3.1724	+ 8	27	43.48	-17.192
η Leonis	3.6	10	2	35.406	3.2730	+17	11	14.47	17.476
α Leonis . (Regulus)	1.3	10	3	44.428	3.1984	+12	23	34.10	17.523
λ Hydræ	3.8	10	6	20.805	2.9246	-11	55	25.00	17.719
q Velorum	4.1	10	11	4.835	2.5127	-41	41	26.10	17.792
32 Ursæ Majoris . .	5.7	10	11	43.864	+4.3956	+65	32	34.32	-17.863
ζ Leonis	3.6	10	11	51.269	3.3426	+23	51	4.61	17.864
λ Ursæ Majoris . .	3.5	10	11	51.373	3.6318	+43	20	57.55	17.894
γ Leonis <i>pr.</i> . . . †	2.6	10	15	10.692	3.3119	+20	16	55.27	18.137
μ Ursæ Majoris . .	3.2	10	17	9.103	3.5866	+41	56	14.90	18.034
30 H. Ursæ Majoris . .	4.9	10	17	52.714	+4.3643	+66	0	24.67	-18.106
30 H. Camelopardalis .	5.3	10	20	34.492	7.6025	+83	0	6.83	18.179
μ Hydræ	4.1	10	21	52.934	2.9004	-16	23	30.39	18.316
31 Leonis Minoris . .	4.4	10	22	51.461	3.4797	+37	9	11.96	18.384
α Antliæ	4.4	10	23	10.145	2.7422	-30	37	29.32	18.306
36 Ursæ Majoris . .	4.8	10	25	4.129	+3.8621	+56	25	37.33	-18.390
9 H. Draconis	5.0	10	27	44.011	5.1899	+76	9	41.87	18.452
ρ Leonis	3.8	10	28	13.912	3.1618	+ 9	45	16.80	18.464
33 Sextantis	6.4	10	36	58.629	3.0520	- 1	17	1.36	18.855
41 Leonis Minoris . .	5.0	10	38	41.307	3.2674	+23	38	39.08	18.788
θ Argûs	3.0	10	39	50.959	+2.1320	-63	56	20.26	-18.859
42 Leonis Minoris . .	5.4	10	41	1.843	3.3430	+31	8	26.98	18.909
η Argûs †	<i>var.</i>	10	41	40.951	2.3204	-59	13	36.99	18.896
μ Argûs †	2.8	10	43	1.464	2.5732	-48	57	37.90	19.007
l Leonis	5.3	10	44	41.160	3.1566	+11	0	20.70	19.006
δ ² Chamæleontis . . †	4.6	10	44	58.640	+0.5961	-80	4	52.70	-18.985
ν Hydræ	3.3	10	45	19.858	2.9581	-15	44	16.54	18.780
46 Leonis Minoris . .	3.9	10	48	27.019	3.3640	+34	41	3.16	19.360
54 Leonis †	4.5	10	50	54.306	3.2534	+25	12	50.57	19.160
ι Antliæ	4.7	10	52	39.923	2.7957	-36	40	11.58	19.324
Groombridge 1706 . .	6.3	10	53	1.693	+4.8948	+78	14	11.48	-19.231
α Crateris	4.2	10	55	32.054	2.9205	-17	50	7.65	19.150
d Leonis	5.0	10	56	4.084	3.0993	+ 4	5	5.27	19.293
β Ursæ Majoris . .	2.4	10	56	36.032	3.6419	+56	50	56.40	19.258
α Ursæ Majoris . .	2.0	10	58	22.218	+3.7302	+62	13	15.30	19.396
η Octantis	6.3	10	59	56.70*	-0.3494	-84	7	33.14	-19.366
χ Leonis	4.7	11	0	31.821	+3.0962	+ 7	48	24.05	19.415
p ⁴ Leonis	5.7	11	2	28.001	+3.0613	+ 2	25	41.26	-19.498

υ Argûs, comp. 6^m.0, 4^{''}.9, s. f.

γ Leonis, comp. 3^m.8, 3^{''}.7, s. f.

η Argûs, var., irreg., 1^m.6-6^m.6

μ Argûs, comp. 7^m, 2^{''}.2, n. f.

δ² Cham., star 5^m.5 pr. 32^s, 256^{''}, s.

54 Leonis, comp. 6^m.3, 6^{''}.4, s. f.

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1 Leonis, comp. $6^m.8, 2''.6$, n. f.	γ Crucis, star, $6^m.6, 85''$, n. f.	γ Virginis, binary, $3^m.7, 3^m.7$, $6'' 2, P=328^d$
2 Can. Ven., star $8^m, 11''.6$, s. pr.	24 Comae, star, $6^m.7, 20''.6$, pr.	
3 Corvi star, $8^m, 24''.4$, s. pr.	γ Cent., dup., $3^m 1, 3^m 1, 1''.4$	

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
76 Ursæ Majoris . . .	5.9	12	37	46.126	+2 6322	+63	11	26.05	-19.792
β Crucis	1.5	12	42	37.717	3.4810	-59	12	48.21	19.733
ι Octantis	5.4	12	45	43.33*	5.9377	-84	39	3.86	19.624
31 Comæ	5.1	12	47	27.711	2.9241	+28	0	50.08	19.642
32 H. Camelop. seq. . †	5.3	12	48	28.663	0.4348	+83	53	8.80	19.583
n Centauri	4.3	12	48	36.810	+3.3122	-39	42	21.25	-19.632
ε Ursæ Majoris (<i>Alioth</i>)	1.7	12	50	12.343	2.6487	+56	25	54.77	19.579
δ Virginis	3.7	12	51	13.225	3.0207	+ 3	52	12.21	19.607
α Canum Venat. seq. . †	2.9	12	51	57.614	2.8109	+38	47	16.91	19.484
δ Muscæ	3.6	12	56	15.966	4.0698	-71	4	47.27	19.476
ε Virginis	3.0	12	57	50.768	+2.9865	+11	25	35.54	-19.396
θ Virginis †	4.4	13	5	26.622	3.1031	- 5	4	29.18	19.274
43 Comæ	4.3	13	7	48.908	2.8027	+28	19	8.22	18.296
20 Canum Venaticorum .	4.7	13	13	38.665	2.6959	+41	1	49.62	19.005
γ Hydræ	3.3	13	14	11.316	3.2551	-22	42	45.99	19.057
ι Centauri	2.9	13	15	42.018	+3.3611	-36	15	13.18	-19.058
ζ ¹ Ursæ Maj. . . (<i>Mizar</i>) †	2.4	13	20	25.561	2.4225	+55	22	46.08	18.853
ζ ² Ursæ Majoris . . .	4.0	Δα + 0.957			. . .	Δδ -12.68			. . .
α Virginis . . . (<i>Spica</i>)	1.2	13	20	36.462	3.1568	-10	42	26.80	18.851
Groombridge 2001 . . .	6.1	13	23	54.818	1.5241	+72	50	34.83	18.736
70 Virginis	5.2	13	24	10.491	+2.9340	+14	14	35.39	-19.293
κ Octantis	5.6	13	26	38.29*	9.0487	-85	20	27.65	18.654
ζ Virginis	3.4	13	30	15.517	3.0544	- 0	9	4.89	18.472
17 H. Canum Venat. . .	5.0	13	30	54.845	2.6819	+37	37	40.50	18.493
ε Centauri	2.6	13	34	22.008	3.7791	-53	1	28.29	18.410
m Virginis	5.2	13	37	2.620	+3.1450	- 8	15	51.60	-18.243
τ Boötis	4.5	13	43	7.667	2.8508	+17	53	23.87	18.024
η Ursæ Majoris (<i>Alkaid</i>)	1.9	13	44	6.869	2.3682	+49	44	49.70	18.035
89 Virginis	5.1	13	45	8.470	3.2537	-17	42	4.08	18.014
ζ Centauri	3.1	13	50	6.321	3.7247	-46	51	38.05	17.840
η Boötis	2.8	13	50	32.541	+2.8567	+18	50	0.44	-18.122
θ Apodis †	var.	13	56	48.740	5.7339	-76	22	38.74	17.527
τ Virginis	4.3	13	57	13.063	3.0512	+ 1	57	54.58	17.509
11 Boötis	6.1	13	57	13.843	2.7216	+27	48	22.91	17.475
β Centauri	0.9	13	57	40.409	4.2041	-59	57	13.57	17.494
π Hydræ	3.5	14	1	24.806	+3.4089	-26	15	49.42	-17.444
θ Centauri	2.3	14	1	33.440	3.5190	-35	56	32.60	17.816
α Draconis	3.6	14	2	2.056	1.6243	+64	47	29.04	17.259
d Boötis	4.8	14	6	25.915	2.7371	+25	30	11.88	17.150
κ Virginis	4.3	14	8	15.168	+3.1966	- 9	52	9.18	16.856
4 Ursæ Minoris	5.0	14	9	10.177	-0.2845	+77	57	22.56	-16.920
ι Virginis	4.2	14	11	27.022	+3.1422	- 5	35	8.77	17.265
α Boötis . . . (<i>Arcturus</i>)	0.2	14	11	41.559	2.7355	+19	38	5.69	18.830
δ Octantis	4.1	14	12	50.81*	9.2252	-83	16	13.94	16.785
λ Boötis	4.3	14	13	4.673	2.2832	+46	29	14.69	16.609
λ Virginis	4.6	14	14	23.949	+3.2405	-12	58	16.02	-16.676
2 Libræ	6.3	14	18	44.583	3.2234	-11	19	1.72	16.550
θ Boötis	4.1	14	22	14.156	+2.0433	+52	15	9.03	-16.713

32 H.Cam., star 5^m.8, 21^{''}.6, n. pr.
α Can. Ven., star 5^m, 19^{''}.8, s. pr.

θ Virginis, comp. 9^m.7^{''}.1, n. pr.
ζ¹ Urs. Maj., star Alcor 4^m.0, f.
79^s.2, 222^{''} n.

θ Apodis, var. irreg. 5^m.5-6^m.6

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δ Libræ, var., $2^{\text{d}}.33.4^{\text{m}}8-6^{\text{m}}.2$ μ Boötis, star $6^{\text{m}}7.108''$ a.	γ Lupi, binary $3^{\text{m}}7.3^{\text{m}}.9.0''.4$ ζ Cor. Bor., comp, $6^{\text{m}}.0.6''.2$ a. pr.
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*Centauri, dup., $0^{\text{m}}.3.1^{\text{m}}.7$: companion a. pr. The position given is that of the center of gravity of the system. Corrections given on page ix remain to be applied to reduce to the positions of the stars.

[Eph 13]

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
12 H. Draconis . . .	5.1	15	45	20.240	+0.9067	+62	52	5.37	-11.181
ε Serpentis . . .	3.8	15	46	28.671	+2.9882	+ 4	44	20.67	10.959
ζ Ursæ Minoris . . .	4.3	15	47	8.506	-2.2076	+78	3	45.33	10.984
β Trianguli Australis . . .	3.0	15	47	27.977	+5.2554	-63	9	47.51	11.365
λ Libræ . . .	5.1	15	48	16.841	3.4771	-19	54	28.28	10.943
γ Serpentis . . .	3.9	15	52	26.028	+2.7696	+15	56	41.73	-11.879
π Scorpïi . . .	3.0	15	53	35.147	3.6234	-25	51	51.93	10.553
ε Coronæ Borealis . . .	4.2	15	53	59.079	2.4822	+27	7	45.05	10.542
δ Scorpïi . . .	2.5	15	55	11.162	3.5420	-22	22	29.55	10.420
θ Draconis . . .	4.1	16	0	15.491	1.1214	+58	47	50.44	9.664
β Scorpïi . . . †	2.9	16	0	22.506	+3.4832	-19	34	4.95	-10.022
κ Herculis . . . †	5.3	16	4	8.817	2.7050	+17	16	40.34	9.730
φ Herculis . . .	4.3	16	6	1.705	1.8897	+45	9	45.21	9.526
Groombridge 2320 . . .	5.4	16	6	4.861	0.1520	+68	2	21.02	9.507
δ ¹ Apodis . . .	4.8	16	7	18.308	8.8468	-78	28	42.43	9.520
δ Ophiuchi . . .	3.0	16	9	47.090	+3.1413	- 3	28	15.58	- 9.417
σ Coronæ Bor. seq. . . †	5.8	16	11	25.205	+2.2458	+34	4	43.24	9.217
19 Ursæ Minoris . . .	5.5	16	13	17.411	-1.7508	+76	5	49.07	8.992
γ ² Normæ . . .	4.1	16	13	19.306	+4.4713	-49	56	35.08	9.061
ε Ophiuchi . . .	3.3	16	13	42.983	3.1717	- 4	28	52.15	8.929
σ Scorpïi . . . †	3.1	16	15	53.855	+3.6413	-25	23	5.52	- 8.834
τ Herculis . . .	3.9	16	17	7.543	1.8030	+46	31	12.11	8.670
γ Herculis . . .	3.8	16	18	4.894	+2.6454	+19	21	24.19	8.587
η Ursæ Minoris . . .	5.0	16	20	1.903	-1.7927	+75	57	22.43	8.217
γ Apodis . . .	3.9	16	20	4.215	+9.0960	-78	42	13.33	8.549
ω Herculis . . .	4.5	16	21	23.798	+2.7617	+14	13	58.43	- 8.420
η Draconis . . . †	2.9	16	22	48.659	0.8075	+61	42	39.21	8.190
α Scorpïi . (Antares) †	1.2	16	24	4.226	3.6738	-26	14	23.10	8.176
β Herculis . . .	2.8	16	26	28.722	2.5774	+21	40	42.39	7.980
λ Ophiuchi . . . †	3.8	16	26	31.459	+3.0238	+ 2	10	25.03	8.030
A Draconis . . .	5.0	16	28	8.844	-0.1305	+68	57	22.98	- 7.785
τ Scorpïi . . .	2.9	16	30	27.824	+3.7293	-28	2	11.01	7.669
σ Herculis . . .	4.2	16	31	17.882	1.9334	+42	36	56.94	7.540
ζ Ophiuchi . . .	2.7	16	32	21.991	3.3006	-10	23	29.88	7.457
24 Scorpïi . . .	5.0	16	36	32.353	3.4664	-17	34	28.27	7.144
ζ Herculis . . . †	3.0	16	38	0.373	+2.2613	+31	45	35.38	- 6.629
α Trianguli Australis . . .	1.9	16	39	26.462	6.3218	-68	52	9.73	6.951
η Herculis . . .	3.6	16	39	54.761	2.0557	+39	5	13.57	6.956
Groombridge 2377 . . .	4.9	16	43	38.797	1.1371	+56	56	13.47	6.494
ε Scorpïi . . .	2.4	16	44	31.509	3.8794	-34	8	10.77	6.746
49 Herculis . . .	6.4	16	48	7.162	+2.7301	+15	7	9.85	- 6.198
ε ¹ Aræ . . .	4.2	16	52	38.664	4.7706	-53	1	40.72	5.823
κ Ophiuchi . . .	3.4	16	53	32.962	+2.8381	+ 9	30	34.34	5.742
ε Ursæ Minoris . . .	4.4	16	54	50.519	-6.2642	+82	10	55.32	5.623
30 Ophiuchi . . .	5.0	16	56	28.348	+3.1628	- 4	5	34.36	5.561
ε Herculis . . .	3.9	16	56	57.627	+2.2945	+31	3	13.97	- 5.421
d Herculis . . .	5.3	16	58	23.568	2.2120	+33	41	36.79	5.333
η Ophiuchi . . . †	2.6	17	5	23.200	+3.4373	-15	37	4.72	- 4.640

β Scorpïi, comp. 5^m.1, 13^{''}.3 n. f.

κ Herculis, star 6^m.5, 29^{''}.7 n. f.

σ Cor. Bor. comp. 6^m.7, 4^{''}.6 s. pr.

δ Scorpïi, star 8^m, 20^{''} pr.

η Draconis, comp. 8^m, 5^{''}.4 s. f.

α Scorpïi, comp. 7^m, 3^{''}.2 pr.

λ Ophiuchi, comp. 6^m, 1^{''}.2 n. f.

ζ Herculis, binary. 3^m.0, 6^m.0, 1^{''}.

η Oph., binary. 3^m.2, 3^m.7, 0^{''}.5

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Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
η Scorpii . . .	3.4	17	5	55.150	+ 4.2919	-43	7	32.22	-4.992
ζ Draconis . . .	3.2	17	8	31.967	0.1686	+65	49	18.04	4.446
α Herculis . . . †	var.	17	10	40.792	2.7344	+14	29	19.44	4.251
δ Herculis . . . †	3.2	17	11	27.443	2.4631	+24	56	28.07	4.372
π Herculis . . .	3.4	17	12	0.962	2.0884	+36	54	23.79	4.167
59 Apodis (G.) . . .	5.9	17	15	10.247	+11.1578	-80	46	50.95	-3.935
θ Ophiuchi . . .	3.4	17	16	39.893	3.6816	-24	54	48.96	3.803
w Herculis . . .	5.4	17	17	24.194	2.2428	+32	34	44.26	4.751
β Aræ . . .	2.8	17	18	3.901	4.9805	-55	26	55.15	3.675
b Ophiuchi . . .	4.3	17	21	3.304	3.6607	-24	5	46.61	3.527
σ Ophiuchi . . .	4.4	17	22	11.850	+ 2.9756	+ 4	12	54.99	-3.283
δ Aræ . . .	3.8	17	23	14.415	5.4053	-60	36	45.83	3.321
α Aræ . . .	3.0	17	25	6.842	4.6326	-49	48	29.77	3.123
λ Herculis . . .	4.5	17	27	13.326	2.4240	+26	10	32.09	2.839
λ Scorpii . . .	1.7	17	27	41.949	4.0708	-37	2	28.28	2.843
β Draconis . . .	3.0	17	28	27.976	+ 1.3541	+52	21	55.41	-2.741
α Ophiuchi . . .	2.1	17	30	53.722	2.7837	+12	37	21.20	2.774
ξ Serpentis . . .	3.6	17	32	36.210	3.4328	-15	20	40.23	2.451
i Herculis . . .	3.8	17	37	0.552	1.6935	+46	3	7.81	2.004
η Pavonis . . .	3.6	17	37	11.394	+ 5.8809	-64	41	0.84	2.072
ω Draconis . . .	4.9	17	37	27.557	- 0.3544	+68	47	53.62	-1.650
β Ophiuchi . . .	2.9	17	39	10.462	+ 2.9628	+ 4	36	10.42	1.661
i ¹ Scorpii . . .	3.1	17	41	29.973	4.1946	-40	5	39.28	1.624
μ Herculis . . .	3.5	17	43	3.184	+ 2.3470	+27	46	15.32	2.230
ψ Draconis . . . †	4.9	17	43	28.955	- 1.0746	+72	11	30.54	1.711
γ Ophiuchi . . .	3.7	17	43	31.784	+ 3.0072	+ 2	44	21.39	-1.512
89 Herculis . . .	5.5	17	51	54.627	2.4206	+26	3	47.53	0.702
ξ Draconis . . .	3.9	17	52	1.532	1.0380	+56	53	9.71	0.621
θ Herculis . . .	4.0	17	53	16.149	+ 2.0570	+37	15	41.23	0.584
35 Draconis . . .	5.0	17	53	20.560	- 2.6903	+76	58	30.10	0.339
ν Ophiuchi . . .	3.5	17	54	14.187	+ 3.3018	- 9	45	49.47	-0.624
ξ Herculis . . .	3.8	17	54	23.052	2.3314	+29	15	23.90	0.509
γ Draconis . . .	2.4	17	54	35.147	1.3924	+51	29	55.33	0.498
67 Ophiuchi . . .	3.9	17	56	17.282	3.0048	+ 2	56	5.97	0.338
θ Aræ . . .	3.9	17	59	51.487	4.6698	-50	5	54.59	0.063
γ Sagittarii . . .	3.1	18	0	13.074	+ 3.8519	-30	25	33.89	-0.179
δ Ursæ Minoris . . .	4.4	18	0	19.30*	-19.4980	+86	36	51.09	+0.076
70 Ophiuchi . . . †	4.1	18	1	3.433	+ 3.0315	+ 2	31	7.96	-1.030
72 Ophiuchi . . .	3.7	18	3	13.475	2.8432	+ 9	33	2.91	+0.369
χ Octantis . . .	5.2	18	3	48.95*	35.7394	-87	39	53.07	0.208
o Herculis . . .	3.8	18	4	8.901	+ 2.3394	+28	44	59.46	+0.365
μ Sagittarii . . .	4.0	18	8	33.595	3.5870	-21	4	56.87	0.747
η Sagittarii . . .	3.2	18	11	44.457	4.0597	-36	47	18.68	0.874
Groombridge 2533 . . .	5.4	18	12	56.388	1.8652	+42	7	44.99	1.130
36 Draconis . . .	5.0	18	13	23.769	0.3456	+64	22	3.52	1.196
δ Sagittarii . . .	2.8	18	15	25.460	+ 3.8406	-29	51	57.64	+1.314
η Serpentis . . .	3.4	18	16	48.436	3.1027	- 2	55	19.59	0.777
ε Sagittarii . . .	2.0	18	18	23.829	+ 3.9815	-34	25	35.54	+1.485

α Herculis, var. irreg., 3^m.1-3^m.9,
dup. comp. 6^m, 4'' .6 s. f.

δ Herculis, binary, comp. 8^m,
14'' s. pr.

ψ Draconis, star 6^m.1, 30'' .4 n. f.
70 Ophiuchi, comp. 6^m, 2'' .1 s.

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Name of Star.		Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
			h	m	s	s	°	'	"	"
109	Herculis . . .	3.9	18	19	59.417	+ 2.5559	+21	43	45.60	+1.485
	α Telescopii . . .	3.8	18	20	31.365	4.4501	-46	1	2.63	1.724
	λ Sagittarii . . .	2.9	18	22	36.101	+ 3.7027	-25	28	14.78	1.775
	χ Draconis . . .	3.7	18	22	37.666	- 1.0784	+72	41	43.00	1.603
	c Serpentis . . .	5.4	18	25	9.309	+ 3.1215	- 2	2	32.45	2.161
	1 Aquilæ . . .	4.1	18	30	28.361	+ 3.2646	- 8	18	20.46	+2.342
	ζ Pavonis . . .	4.1	18	32	52.355	7.0209	-71	30	15.08	2.701
	α Lyrae . . . (Vega)	0.1	18	33	59.569	2.0314	+38	42	7.61	3.243
	2 Aquilæ . . .	4.7	18	37	30.671	3.2866	- 9	8	11.73	3.260
	φ Sagittarii . . .	3.3	18	40	13.269	3.7488	-27	4	51.82	3.494
110	Herculis . . .	4.3	18	41	55.000	+ 2.5803	+20	27	44.28	+3.304
	6 Aquilæ . . .	4.5	18	42	33.500	3.1829	- 4	50	30.32	3.678
	λ Pavonis . . .	4.4	18	44	9.523	5.5667	-62	17	18.37	3.816
	β Lyrae . . . †	var.	18	46	52.060	+ 2.2147	+33	15	39.82	4.066
50	Draconis . . .	5.4	18	49	11.264	- 1.9189	+75	19	53.85	4.320
	σ Sagittarii . . .	2.1	18	49	52.234	+ 3.7202	-26	24	20.71	+4.253
	o Draconis . . . †	4.8	18	49	55.178	0.8882	+59	16	54.32	4.355
	θ Serpentis pr. . . †	4.5	18	51	53.653	2.9822	+ 4	5	22.62	4.528
	R Lyrae . . . †	var.	18	52	41.284	1.8260	+43	49	51.59	4.646
	ε Aquilæ . . .	4.2	18	55	40.413	2.7221	+14	56	57.74	4.741
	γ Lyrae . . .	3.3	18	55	41.324	+ 2.2434	+32	34	10.44	+4.818
	ζ Sagittarii . . . †	2.7	18	57	4.612	3.8181	-30	0	19.99	4.922
	ξ Aquilæ . . .	3.0	19	1	24.670	2.7569	+13	44	0.26	5.208
	λ Aquilæ . . .	3.6	19	1	37.916	3.1836	- 5	0	49.21	5.243
	α Coronæ Australis . .	4.1	19	3	33.225	4.0834	-38	2	27.86	5.370
	ι Lyrae . . .	5.1	19	4	11.855	+ 2.1412	+35	57	47.40	+5.536
	π Sagittarii . . .	3.0	19	4	35.437	+ 3.5690	-21	9	45.81	5.539
	λ Ursæ Minoris . . .	6.6	19	7	25.98*	-71.1246	+89	0	39.69	5.820
	ψ Sagittarii . . .	4.9	19	10	12.408	+ 3.6803	-25	24	27.04	6.010
	δ Draconis . . .	3.2	19	12	32.325	0.0228	+67	30	30.54	6.327
	d Sagittarii . . .	5.0	19	12	32.714	+ 3.5111	-19	6	30.81	+6.223
	θ Lyrae . . .	4.5	19	13	20.864	2.0808	+37	58	41.91	6.313
	ω Aquilæ . . .	5.1	19	13	43.972	2.8159	+11	26	16.05	6.353
	κ Cygni . . .	4.0	19	15	5.579	+ 1.3879	+53	12	27.20	6.573
	τ Draconis . . .	4.6	19	17	14.079	- 1.1344	+73	11	39.43	6.738
	δ Aquilæ . . .	3.4	19	21	6.719	+ 3.0250	+ 2	56	26.06	+7.029
	σ Octantis . . .	5.5	19	21	19.15*	96.7422	-89	13	57.47	6.963
	β Cygni . . . †	3.2	19	27	12.750	2.4189	+27	46	34.64	7.435
	ι Cygni . . .	3.9	19	27	30.783	1.5133	+51	32	38.51	7.598
	μ Aquilæ . . .	4.6	19	29	50.389	2.9312	+ 7	11	37.02	7.512
	h Sagittarii . . .	4.7	19	31	24.847	+ 3.6532	-25	4	35.26	+7.760
	κ Aquilæ . . .	5.0	19	32	12.723	3.2289	- 7	13	17.58	7.851
	θ Cygni . . .	4.6	19	34	6.528	1.6090	+50	1	9.03	8.252
54	Sagittarii . . .	5.4	19	35	44.412	3.4389	-16	29	36.69	8.086
	β Sagittæ . . .	4.4	19	37	8.468	2.6939	+17	16	25.79	8.213
15	Cygni . . .	5.0	19	41	8.377	+ 2.1640	+37	8	37.57	+8.602
	f Sagittarii . . .	5.1	19	41	17.289	3.5017	-19	58	15.54	8.485
	γ Aquilæ . . .	2.8	19	42	7.410	+ 2.8520	+10	24	1.91	+8.636
β Lyrae, var., 12 ^d .9, 3 ^m .4-4 ^m .1, star 7 ^m , 46'' s. f.			θ Serpentis, star 5 ^m .4, 22''.2 s. f.			ζ Sag., binary 3 ^m .4, 3 ^m .6, 0''.5				
o Draco., star 7 ^m .6, 32''.1 n. pr.			R Lyrae, var., 46 ^d .4, 4 ^m .0-4 ^m .7			β Cygni, star 5 ^m .4, 34''.7 n. f.				

δ Cygni, comp. 8^m, 1'' .6 n. pr.
 η Aquilæ, var., 7^d.18, 3^m.7-4^m.4
 ϵ Draconis, comp., 7^m.6, 3'' .1 n.
 θ Cygni, star 5^m.0 pr. 19', 270''
 n, star 7^m.8 f. 1', 96'' s.

κ Cephei, comp. 8^m, 7'' 5 s. f.
 α^2 Capricor., α^1 Capricor., 4^m.6
 pr. 24', 137'' n.
 β Capricor., star 6^m.2 pr. 14',
 10'' s.

(Eph 13)

π Capricor., comp. 9^m, 3'' .4, s. f.
 ρ Capricor., comp. 7^m.6, 2'' .8 s.
 β Delphini, binary 4^m.1, 5^m.4,
 0'' .5
 γ Delphini, comp. 5^m.5, 11'' .2 pr.

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		h	m	s	s	°	'	"	"
61 Cygni seq. . . .	6.3	$\Delta\alpha$ +1.552			. . .	$\Delta\delta$ -15.85			. . .
ν Aquarii	4.5	21	4	51.367	+3.2702	-11	43	27.91	+14.466
Bradley 2777	5.9	21	7	15.766	-1.1379	+77	46	25.54	14.646
3 Piscis Australis	5.6	21	8	7.953	+3.5638	-27	58	29.12	14.562
ζ Cygni	3.4	21	9	13.967	2.5520	+29	52	10.32	14.673
τ Cygni †	3.8	21	11	19.060	+2.3939	+37	40	24.93	+15.290
α Equulei	4.1	21	11	28.509	2.9993	+ 4	53	15.46	14.781
σ Cygni	4.3	21	13	59.882	2.3547	+39	1	47.04	15.016
θ^1 Microscopii	4.9	21	15	11.909	3.8454	-41	10	40.42	15.088
α Cephei	2.6	21	16	30.283	1.4351	+62	13	0.09	15.207
1 Capricorni	4.3	21	17	24.275	+3.3444	-17	12	20.19	+15.212
1 Pegasi	4.2	21	18	3.768	2.7740	+19	25	54.44	15.310
γ Pavonis	4.3	21	19	15.867	5.0033	-65	45	38.69	16.099
ζ Capricorni	3.9	21	21	42.171	3.4306	-22	47	19.31	15.471
g Cygni †	5.3	21	26	14.290	2.2125	+46	9	23.89	15.806
β Aquarii	3.1	21	26	58.803	+3.1600	- 5	57	16.06	+15.731
β Cephei †	3.3	21	27	32.588	0.7867	+70	10	43.11	15.777
ξ Aquarii	4.8	21	33	7.307	3.1958	- 8	14	41.49	16.045
74 Cygni	5.1	21	33	27.678	2.4032	+40	1	20.11	16.095
γ Capricorni	3.8	21	35	16.367	3.3275	-17	3	20.57	16.162
λ Octantis †	5.4	21	37	41.405	+9.5556	-83	7	12.22	+16.291
ϵ Pegasi	2.5	21	39	54.768	2.9461	+ 9	28	32.30	16.416
11 Cephei	4.8	21	40	39.063	0.8888	+70	54	38.31	16.546
δ Capricorni	3.0	21	42	14.441	3.3144	-16	31	21.23	16.235
π^2 Cygni	4.3	21	43	34.681	2.2143	+48	54	24.03	16.597
μ Capricorni	5.2	21	48	33.249	+3.2733	-13	57	42.80	+16.839
γ Gruis	3.2	21	48	39.850	3.6418	-37	46	28.49	16.823
16 Pegasi	5.0	21	49	6.168	2.7283	+25	30	55.71	16.870
79 Draconis	6.6	21	51	46.372	0.7198	+73	17	25.97	17.005
ϵ Indi	4.7	21	56	42.665	4.6112	-57	8	38.19	14.640
20 Pegasi	5.7	21	56	51.027	+2.9222	+12	42	9.86	+17.167
α Aquarii	3.2	22	1	18.967	3.0821	- 0	44	34.29	17.415
1 Aquarii	4.4	22	1	44.392	3.2428	-14	17	31.91	17.374
20 Cephei	5.4	22	2	21.830	1.8226	+62	21	39.12	17.514
α Gruis	2.2	22	2	45.301	3.7946	-47	22	58.67	17.305
1 Pegasi	4.0	22	2	57.611	+2.7913	+24	55	11.15	+17.509
θ Pegasi	3.7	22	5	48.698	3.0267	+ 5	46	10.25	17.644
π Pegasi	4.4	22	6	7.346	2.6625	+32	45	3.43	17.603
ζ Cephei	3.6	22	7	50.053	2.0778	+57	46	19.83	17.703
24 Cephei	5.0	22	8	8.254	1.1582	+71	54	44.78	17.708
θ Aquarii	4.3	22	12	14.626	+3.1674	- 8	13	0.55	+17.852
α Tucanæ	2.9	22	12	32.956	4.1365	-60	41	36.46	17.848
ν Octantis	5.7	22	15	19.18*	12.4294	-86	24	39.46	18.065
γ Aquarii	4.0	22	17	9.789	3.0992	- 1	49	33.54	18.077
31 Pegasi	4.9	22	17	14.148	2.9529	+11	45	59.21	18.071
3 Lacertæ	4.6	22	20	8.213	+2.3553	+51	47	34.42	+17.984
π Aquarii	4.6	22	20	50.036	3.0638	+ 0	56	7.89	18.197
σ Aquarii	4.9	22	26	2.682	+3.1773	-11	7	24.32	+18.359

τ Cygni, comp. 7^m, 0".8 pr.
 g Cygni, star 6^m.7 f. 10^a, 420" s.

β Cephei, star 8^m, 13".3 s. pr.

λ Octantis, binary 5^m.5, 8^m.0,
3".2 n. f.

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		h	m	s		°	'	"	
α Lacertæ . . .	3.8	22	27	42.328	+2.4677	+49	50	5.60	+18.456
υ Aquarii . . .	5.3	22	29	56.159	3.2854	-21	9	15.56	18.363
226 B. Cephei . . .	5.7	22	30	44.973	1.0655	+75	46	40.83	18.545
η Aquarii . . .	4.1	22	30	53.171	3.0833	- 0	33	58.29	18.496
10 Lacertæ . . .	4.9	22	35	21.347	2.6886	+38	35	49.70	18.683
ε Piscis Australis . . .	4.2	22	35	50.755	+3.3231	-27	29	52.31	+18.698
ζ Pegasi . . .	3.6	22	37	7.360	2.9914	+10	22	36.72	18.735
β Octantis . . .	4.3	22	37	13.726	6.3348	-81	50	17.38	18.754
β Gruis . . .	2.2	22	37	28.656	3.5969	-47	20	23.92	18.734
η Pegasi . . .	3.1	22	38	55.329	2.8090	+29	45	56.98	18.767
λ Pegasi . . .	4.1	22	42	20.335	+2.8868	+23	6	27.18	+18.897
ε Gruis . . .	3.7	22	43	18.282	3.6391	-51	46	28.29	18.875
τ Aquarii . . .	4.2	22	44	59.240	3.1793	-14	3	7.23	18.949
μ Pegasi . . .	3.7	22	45	48.176	2.8930	+24	8	30.97	18.963
ι Cephei . . .	3.7	22	46	34.797	2.1276	+65	44	33.37	18.900
λ Aquarii . . .	3.8	22	48	4.589	+3.1311	- 8	2	34.12	+19.102
ρ Indi . . .	6.1	22	48	37.089	4.2183	-70	32	19.58	19.135
δ Aquarii . . .	3.5	22	50	2.062	3.1865	-16	17	1.49	19.093
α Pisc.Aust.(Fomalhaut) . . .	1.3	22	52	50.766	3.3214	-30	5	1.07	19.020
ο Andromedæ . . .	3.6	22	57	54.897	2.7542	+41	51	29.47	19.305
β Pegasi . . . †	var.	22	59	33.287	+2.9050	+27	36	38.27	+19.488
α Pegasi . (Markab) . . .	2.6	23	0	25.557	2.9862	+14	44	13.07	19.333
55 Pegasi . . .	4.7	23	2	37.259	3.0208	+ 8	56	21.32	19.408
ε² Aquarii . . .	3.8	23	4	48.568	3.2023	-21	38	41.69	19.508
π Cephei . . . †	4.6	23	5	7.637	1.8989	+74	55	1.30	19.441
ι Gruis . . .	4.1	23	5	26.294	+3.4079	-45	43	5.50	+19.449
59 Pegasi . . .	5.2	23	7	20.609	3.0277	+ 8	14	51.07	19.523
5 Cassiopeiæ (Heis) . . .	5.6	23	9	5.382	2.8780	+56	41	16.57	19.851
φ Aquarii . . .	4.4	23	9	49.021	3.1073	- 6	31	5.56	19.373
φ Aquarii . . . †	4.5	23	11	20.087	3.1450	- 9	33	42.35	19.590
γ Tucanæ . . .	4.1	23	12	21.473	+3.5208	-58	42	47.47	+19.674
γ Piscium . . .	3.8	23	12	39.294	3.1094	+ 2	48	24.38	19.640
γ Sculptoris . . .	4.5	23	14	7.705	3.2453	-33	0	22.21	19.580
ο Cephei . . . †	4.9	23	15	2.863	2.4509	+67	38	7.35	19.679
τ Pegasi . . .	4.6	23	16	19.722	2.9655	+23	15	50.17	19.671
β¹ Aquarii . . .	4.2	23	18	24.149	+3.1533	-20	34	32.58	+19.627
4 Cassiopeiæ . . .	5.2	23	20	57.991	2.6496	+61	48	18.21	19.746
υ Pegasi . . .	4.6	23	21	2.105	2.9903	+22	55	29.78	19.787
κ Piscium . . .	4.9	23	22	28.358	3.0752	+ 0	46	45.32	19.685
θ Piscium . . .	4.4	23	23	33.250	3.0419	+ 5	54	3.73	19.752
70 Pegasi . . .	4.7	23	24	45.210	+3.0320	+12	16	49.72	+19.845
39 H. Cephei . . .	5.6	23	27	45.157	-0.2454	+86	49	39.43	19.868
β Sculptoris . . .	4.5	23	28	18.557	+3.2252	-38	17	58.85	19.860
72 Pegasi (mean) . . . †	5.2	23	29	38.045	2.9706	+30	50	42.42	19.861
λ Andromedæ . . .	4.0	23	33	18.116	2.9276	+45	59	12.25	19.490
ι Andromedæ . . .	4.3	23	33	51.928	+2.9343	+42	47	10.90	+19.915
ι Piscium . . .	4.3	23	35	28.488	3.0843	+ 5	9	16.79	19.495
γ Cephei . . .	3.4	23	35	46.103	+2.4372	+77	8	48.46	+20.091

β Pegasi, var. irreg., 2^m.2-2^m.7 | φ Aquarii, star 8^m.5, 49'' .4 n. pr. | 72 Pegasi, 6^m.0, 6^m.0, 0'' .4
π Cephei, comp. 7^m, 0'' .9 n. f. | ο Cephei, comp. 8^m, 2'' .9 s. pr.

WASHINGTON, JANUARY ^{od.248.}

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.			Annual Variation.
		h	m	s		°	'	"	
κ Andromedæ . . .	4.3	23	36	7.144	+2.9469	+43	51	7.48	+19.913
ω ² Aquarii . . .	4.6	23	38	12.692	3.1129	-15	1	33.33	19.893
ι ¹ Aquarii . . .	5.3	23	39	41.439	3.1146	-18	45	35.77	19.961
ψ Andromedæ . . .	5.1	23	41	43.112	2.9631	+45	56	13.69	19.974
41 H. Cephei . . .	5.0	23	43	44.573	2.8483	+67	19	23.95	19.986
δ Sculptoris . . .	4.6	23	44	23.729	+3.1281	-28	36	42.35	+19.866
γ ¹ Octantis . . .	5.1	23	47	1.961	3.6221	-82	30	8.43	20.002
φ Pegasi . . .	5.2	23	48	3.588	3.0479	+18	38	13.48	19.979
ρ Cassiopeiæ . . .	4.8	23	50	1.785	2.9808	+57	0	55.37	20.028
Groombridge 4163 . . .	6.6	23	50	34.945	2.8781	+73	55	34.13	20.024
ω Piscium . . .	4.0	23	54	50.579	+3.0794	+ 6	22	54.19	+19.933
ε Tucanæ . . .	4.7	23	55	24.185	3.1405	-66	3	39.16	20.034
30 Piscium . . .	4.7	23	57	29.905	3.0772	- 6	29	51.23	20.007
2 Ceti . . .	4.6	23	59	17.038	+3.0754	-17	49	13.35	+20.033

NORTHERN CIRCUMPOLARS.

43 H. Cephei . . .	4.5	0	56	38.823	+ 7.5880	+85	47	27.59	+19.432
α Ursæ Minoris (<i>Polaris</i>)	2.1	1	28	19.01*	28.0572	+88	50	29.36	18.578
Groombridge 750 . . .	6.7	4	8	52.234	17.5460	+85	19	32.98	9.386
Groombridge 944 . . .	6.4	5	33	57.736	18.7532	+85	9	21.38	+ 2.268
51 H. Cephei . . .	5.3	7	0	7.12*	29.2898	+87	11	16.00	- 5.233
Groombridge 1119 . . .	7.0	8	11	46.151	+61.2112	+88	53	44.41	-10.883
1 H. Draconis . . .	4.6	9	24	46.516	8.8162	+81	42	44.16	15.648
30 H. Camelop. . .	5.3	10	20	34.492	7.6025	+83	0	6.83	18.179
Bradley 1672 . . .	6.3	12	14	26.979	+ 0.3471	+88	10	55.87	19.948
Groombridge 2283 . . .	7.2	15	4	59.30*	-19.6650	+87	34	6.01	13.831
ε Ursæ Minoris . . .	4.4	16	54	50.519	- 6.2642	+82	10	55.32	- 5.623
δ Ursæ Minoris . . .	4.4	18	0	19.30*	19.4980	+86	36	51.09	+ 0.076
λ Ursæ Minoris . . .	6.6	19	7	25.98*	71.1246	+89	0	39.69	5.820
76 Draconis . . .	5.7	20	48	57.123	4.1464	+82	12	35.90	13.500
39 H. Cephei . . .	5.6	23	27	45.157	- 0.2454	+86	49	39.43	+19.868

SOUTHERN CIRCUMPOLARS.

4 Octantis (G.) . . .	5.6	1	42	17.46*	- 3.8020	-85	12	33.92	+18.110
31 Mensæ (G.) . . .	6.2	5	47	1.50*	11.6895	-84	49	51.91	+ 1.220
7 Octantis (G.) . . .	6.4	7	17	41.19*	20.1724	-86	53	40.29	- 6.661
ζ Octantis . . .	5.4	9	9	30.42*	8.0876	-85	18	58.68	14.708
η Octantis . . .	6.3	10	59	56.70*	- 0.3494	-84	7	33.14	19.366
ι Octantis . . .	5.4	12	45	43.33*	+ 5.9377	-84	39	3.86	-19.624
δ Octantis . . .	4.1	14	12	50.81*	9.2252	-83	16	13.94	-16.785
χ Octantis . . .	5.2	18	3	48.95*	35.7394	-87	39	53.07	+ 0.208
σ Octantis . . .	5.5	19	21	19.15*	96.7422	-89	13	57.47	6.963
ν Octantis . . .	5.7	22	15	19.18*	+12.4294	-86	24	39.46	+18.065

[Eph 13]

APPARENT PLACES OF
FOR THE UPPER TRANSIT AT

R STARS

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			<i>α</i> Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m ° ' "			h m ° ' "			h m ° ' "			h m ° ' "			h m ° ' "	
Feb.	0 56	+85 47	Feb.	1 27	+88 50	Feb.	4 8	+85 19	Feb.	5 34	+85 9	Feb.	7 0	+87 11
	s	"		s	"		s	"		s	"		s	"
1.2	23.75	48.60	1.2	33.70	52.80	1.3	56.31	59.40	1.4	9.14	44.26	1.4	36.89	32.31
2.2	23.50	48.52	2.2	32.71	52.77	2.3	56.12	59.56	2.4	9.01	44.50	2.4	36.80	32.60
3.2	23.23	48.42	3.2	31.68	52.72	3.3	55.90	59.71	3.4	8.87	44.75	3.4	36.69	32.91
4.2	22.95	48.32	4.2	30.59	52.66	4.3	55.67	59.88	4.4	8.70	45.00	4.4	36.56	33.23
5.2	22.66	48.20	5.2	29.47	52.59	5.3	55.42	60.04	5.4	8.53	45.26	5.4	36.41	33.56
6.2	22.37	48.05	6.2	28.33	52.49	6.3	55.17	60.18	6.4	8.34	45.51	6.4	36.23	33.88
7.2	22.08	47.89	7.2	27.20	52.37	7.3	54.91	60.31	7.3	8.14	45.76	7.4	36.03	34.20
8.2	21.81	47.70	8.2	26.10	52.24	8.3	54.64	60.41	8.3	7.93	45.98	8.4	35.79	34.51
9.2	21.55	47.50	9.2	25.04	52.08	9.3	54.36	60.48	9.3	7.70	46.17	9.4	35.53	34.80
10.1	21.32	47.29	10.2	24.05	51.92	10.3	54.09	60.55	10.3	7.48	46.34	10.4	35.27	35.06
11.1	21.09	47.07	11.2	23.13	51.75	11.3	53.84	60.58	11.3	7.26	46.50	11.4	35.00	35.31
12.1	20.90	46.86	12.2	22.28	51.58	12.3	53.60	60.61	12.3	7.06	46.64	12.4	34.74	35.53
13.1	20.71	46.67	13.2	21.48	51.42	13.3	53.37	60.64	13.3	6.87	46.77	13.4	34.50	35.75
14.1	20.52	46.49	14.2	20.72	51.27	14.3	53.15	60.68	14.3	6.69	46.90	14.4	34.29	35.96
15.1	20.33	46.33	15.2	19.94	51.14	15.3	52.94	60.74	15.3	6.52	47.04	15.4	34.10	36.17
16.1	20.13	46.17	16.2	19.12	51.02	16.3	52.73	60.81	16.3	6.36	47.21	16.4	33.91	36.41
17.1	19.91	46.02	17.2	18.24	50.92	17.3	52.51	60.89	17.3	6.19	47.39	17.4	33.74	36.67
18.1	19.66	45.86	18.1	17.29	50.80	18.3	52.27	60.99	18.3	6.01	47.59	18.4	33.54	36.94
19.1	19.41	45.68	19.1	16.29	50.66	19.3	52.02	61.09	19.3	5.81	47.78	19.4	33.30	37.22
20.1	19.16	45.47	20.1	15.27	50.50	20.3	51.75	61.15	20.3	5.59	47.97	20.4	33.03	37.50
21.1	18.92	45.24	21.1	14.27	50.31	21.3	51.47	61.20	21.3	5.35	48.13	21.4	32.72	37.78
22.1	18.69	44.98	22.1	13.34	50.09	22.3	51.19	61.20	22.3	5.10	48.28	22.4	32.39	38.03
23.1	18.50	44.71	23.1	12.49	49.85	23.2	50.91	61.19	23.3	4.85	48.38	23.4	32.03	38.25
24.1	18.34	44.44	24.1	11.74	49.60	24.2	50.65	61.14	24.3	4.60	48.46	24.4	31.68	38.44
25.1	18.18	44.18	25.1	11.07	49.37	25.2	50.41	61.08	25.3	4.38	48.52	25.4	31.33	38.61
26.1	18.04	43.93	26.1	10.45	49.14	26.2	50.18	61.03	26.3	4.16	48.57	26.4	31.01	38.78
27.1	17.90	43.69	27.1	9.85	48.94	27.2	49.96	60.98	27.3	3.95	48.63	27.4	30.72	38.93
28.1	17.76	43.47	28.1	9.24	48.74	28.2	49.74	60.96	28.3	3.74	48.70	28.4	30.43	39.09
29.1	17.62	43.25	29.1	8.58	48.55	29.2	49.52	60.94	29.3	3.54	48.78	29.3	30.15	39.27
30.1	17.45	43.02	30.1	7.87	48.35	30.2	49.29	60.94	30.3	3.34	48.88	30.3	29.85	39.47
13.64 +13.60 0 ^h 56 ^m 38 ^s .823 +85° 47' 27".59			49.72 +49.71 1 ^h 28 ^m 19 ^s .01 +88° 50' 29".36			12.29 +12.25 4 ^h 8 ^m 52 ^s .234 +85° 19' 32".98			11.86 +11.82 5 ^h 33 ^m 57 ^s .736 +85° 9' 21".38			20.42 +20.40 7 ^h 0 ^m 7 ^s .12 +87° 11' 16".00		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Mar.	h m 0 56	° ' +85 47	Mar.	h m 1 26	° ' +88 50	Mar.	h m 4 8	° ' +85 19	Mar.	h m 5 33	° ' +85 9	Mar.	h m 7 0	° ' +87 11
	s "	"		s "	"		s "	"		s "	"		s "	"
1.1	17.62	43.25	1.1	68.58	48.55	1.2	49.52	60.94	1.3	63.54	48.78	1.	30.15	39.27
2.1	17.45	43.02	2.1	67.87	48.35	2.2	49.29	60.94	2.3	63.34	48.88	2.3	29.85	39.47
3.1	17.28	42.80	3.1	67.12	48.15	3.2	49.05	60.93	3.3	63.13	48.98	3.3	29.55	39.67
4.1	17.09	42.56	4.1	66.34	47.94	4.2	48.79	60.92	4.3	62.90	49.09	4.3	29.24	39.88
5.1	16.90	42.30	5.1	65.55	47.72	5.2	48.53	60.90	5.3	62.64	49.19	5.3	28.89	40.09
6.1	16.73	42.02	6.1	64.76	47.47	6.2	48.26	60.86	6.3	62.38	49.28	6.3	28.52	40.30
7.1	16.56	41.73	7.1	64.00	47.20	7.2	47.98	60.82	7.3	62.12	49.36	7.3	28.13	40.49
8.1	16.41	41.42	8.1	63.28	46.92	8.2	47.70	60.74	8.3	61.84	49.40	8.3	27.72	40.67
9.1	16.27	41.10	9.1	62.64	46.63	9.2	47.43	60.63	9.3	61.57	49.43	9.3	27.29	40.82
10.1	16.16	40.78	10.1	62.07	46.33	10.2	47.17	60.51	10.3	61.30	49.44	10.3	26.86	40.94
11.1	16.08	40.45	11.1	61.59	46.03	11.2	46.93	60.38	11.3	61.04	49.42	11.3	26.45	41.05
12.1	16.00	40.14	12.1	61.18	45.74	12.2	46.70	60.23	12.3	60.81	49.39	12.3	26.04	41.14
13.1	15.93	39.85	13.1	60.82	45.46	13.2	46.48	60.10	13.3	60.59	49.36	13.3	25.66	41.22
14.1	15.87	39.58	14.1	60.46	45.21	14.2	46.29	59.97	14.3	60.38	49.34	14.3	25.31	41.30
15.1	15.81	39.32	15.1	60.07	44.97	15.2	46.10	59.87	15.3	60.17	49.33	15.3	24.98	41.39
16.1	15.72	39.09	16.1	59.64	44.73	16.2	45.90	59.78	16.2	59.97	49.34	16.3	24.66	41.50
17.1	15.63	38.85	17.1	59.15	44.51	17.2	45.69	59.71	17.2	59.76	49.37	17.3	24.33	41.62
18.1	15.52	38.60	18.1	58.61	44.27	18.2	45.46	59.64	18.2	59.55	49.40	18.3	23.98	41.76
19.0	15.40	38.32	19.1	58.04	44.02	19.2	45.23	59.56	19.2	59.30	49.43	19.3	23.60	41.90
20.0	15.29	38.01	20.1	57.49	43.72	20.2	44.98	59.44	20.2	59.05	49.44	20.3	23.18	42.04
21.0	15.19	37.69	21.1	56.98	43.42	21.2	44.73	59.30	21.2	58.78	49.42	21.3	22.75	42.15
22.0	15.13	37.35	22.1	56.57	43.09	22.2	44.49	59.13	22.2	58.50	49.38	22.3	22.29	42.23
23.0	15.09	37.01	23.1	56.26	42.76	23.2	44.26	58.94	23.2	58.24	49.30	23.3	21.84	42.28
24.0	15.08	36.68	24.1	56.05	42.44	24.2	44.05	58.73	24.2	57.99	49.20	24.3	21.39	42.31
25.0	15.09	36.36	25.1	55.90	42.11	25.2	43.86	58.52	25.2	57.77	49.09	25.3	20.96	42.31
26.0	15.09	36.06	26.1	55.79	41.81	26.2	43.68	58.32	26.2	57.56	48.98	26.3	20.57	42.32
27.0	15.10	35.78	27.0	55.69	41.53	27.2	43.52	58.14	27.2	57.36	48.88	27.3	20.19	42.32
28.0	15.10	35.50	28.0	55.55	41.26	28.2	43.35	57.97	28.2	57.16	48.79	28.3	19.83	42.33
29.0	15.08	35.24	29.0	55.37	40.99	29.2	43.18	57.81	29.2	56.96	48.72	29.3	19.47	42.37
30.0	15.06	34.97	30.0	55.14	40.73	30.2	43.01	57.65	30.2	56.75	48.66	30.3	19.10	42.41
31.0	15.02	34.68	31.0	54.87	40.46	31.1	42.81	57.50	31.2	56.54	48.61	31.3	18.71	42.46
32.0	14.99	34.38	32.0	54.59	40.18	32.1	42.61	57.34	32.2	56.31	48.56	32.3	18.31	42.51
13.64 +13.60			49.65 +49.64			12.29 +12.25			11.86 +11.82			20.43 +20.41		
0 ^h 56 ^m 38 ^s .823			1 ^h 28 ^m 19 ^s .01			4 ^h 8 ^m 52 ^s .234			5 ^h 33 ^m 57 ^s .736			7 ^h 0 ^m 7 ^s .12		
+85° 47' 27".59			+88° 50' 29".36			+85° 19' 32".98			+85° 9' 21".38			+87° 11' 16".00		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Apr.	h m 0 56	° ' +85 47	Apr.	h m 1 26	° ' +88 50	Apr.	h m 4 8	° ' +85 19	Apr.	h m 5 33	° ' +85 9	Apr.	h m 7 0	° ' +87 11
	s "	"		s "	"		s "	"		s "	"		s "	"
1.0	14.99	34.38	1.0	54.59	40.18	1.1	42.61	57.34	1.2	56.31	48.56	1.3	18.31	42.51
2.0	14.96	34.06	2.0	54.32	39.87	2.1	42.39	57.16	2.2	56.08	48.49	2.3	17.89	42.56
3.0	14.93	33.74	3.0	54.07	39.56	3.1	42.18	56.97	3.2	55.83	48.41	3.3	17.45	42.60
4.0	14.92	33.40	4.0	53.86	39.22	4.1	41.97	56.75	4.2	55.57	48.30	4.3	17.00	42 62
5.0	14.92	33.06	5.0	53.73	38.88	5.1	41.78	56.53	5.2	55.32	48.17	5.3	16.52	42.62
5.9	14.95	32.72	6.0	53.68	38.52	6.1	41.59	56.27	6.2	55.07	48.03	6.3	16.05	42.59
6.9	15.01	32.38	7.0	53.70	38.18	7.1	41.41	56.01	7.2	54.84	47.86	7.2	15.59	42.55
7.9	15.09	32.05	8.0	53.80	37.84	8.1	41.26	55.74	8.2	54.62	47.68	8.2	15.15	42.47
8.9	15.17	31.74	9.0	53.95	37.51	9.1	41.12	55.46	9.2	54.43	47.49	9.2	14.74	42.38
9.9	15.26	31.45	10.0	54.13	37.22	10.1	41.01	55.20	10.2	54.25	47.30	10.2	14.36	42.30
10.9	15.35	31.18	11.0	54.31	36.94	11.1	40.89	54.96	11.2	54.09	47.13	11.2	14.01	42.22
11.9	15.43	30.93	12.0	54.45	36.67	12.1	40.78	54.74	12.2	53.93	46.98	12.2	13.67	42.16
12.9	15.49	30.69	13.0	54.52	36.41	13.1	40.67	54.54	13.2	53.76	46.85	13.2	13.33	42.11
13.9	15.53	30.44	13.9	54.56	36.14	14.1	40.54	54.35	14.2	53.59	46.72	14.2	12.98	42.08
14.9	15.57	30.18	14.9	54.56	35.89	15.1	40.40	54.15	15.2	53.41	46.61	15.2	12.62	42.07
15.9	15.60	29.90	15.9	54.55	35.60	16.1	40.24	53.94	16.2	53.21	46.48	16.2	12.23	42.04
16.9	15.66	29.59	16.9	54.57	35.29	17.1	40.08	53.69	17.2	52.99	46.33	17.2	11.81	41.99
17.9	15.73	29.27	17.9	54.67	34.96	18.1	39.93	53.42	18.2	52.78	46.14	18.2	11.37	41.92
18.9	15.82	28.95	18.9	54.87	34.62	19.1	39.80	53.14	19.2	52.57	45.93	19.2	10.92	41.81
19.9	15.95	28.64	19.9	55.16	34.29	20.1	39.69	52.82	20.2	52.38	45.70	20.2	10.50	41.68
20.9	16.10	28.34	20.9	55.54	33.97	21.1	39.60	52.50	21.2	52.22	45.46	21.2	10.10	41.53
21.9	16.26	28.06	21.9	55.97	33.67	22.1	39.53	52.19	22.1	52.06	45.21	22.2	9.72	41.37
22.9	16.42	27.81	22.9	56.42	33.39	23.1	39.47	51.90	23.1	51.93	44.96	23.2	9.37	41.20
23.9	16.58	27.57	23.9	56.85	33.12	24.1	39.42	51.63	24.1	51.80	44.74	24.2	9.04	41.06
24.9	16.72	27.34	24.9	57.24	32.87	25.1	39.37	51.37	25.1	51.68	44.53	25.2	8.74	40.93
25.9	16.85	27.11	25.9	57.59	32.63	26.1	39.31	51.12	26.1	51.55	44.33	26.2	8.43	40.81
26.9	16.97	26.88	26.9	57.89	32.38	27.1	39.24	50.88	27.1	51.42	44.15	27.2	8.11	40.70
27.9	17.08	26.64	27.9	58.15	32.12	28.1	39.16	50.64	28.1	51.27	43.96	28.2	7.78	40.60
28.9	17.19	26.40	28.9	58.41	31.85	29.1	39.07	50.39	29.1	51.12	43.77	29.2	7.42	40.49
29.9	17.31	26.13	29.9	58.69	31.56	30.1	38.98	50.13	30.1	50.96	43.57	30.2	7.05	40.38
30.9	17.44	25.85	30.9	59.01	31.27	31.1	38.89	49.85	31.1	50.79	43.35	31.2	6.67	40.25
31.9	17.59	25.57	31.9	59.39	30.97	32.1	38.81	49.56	32.1	50.63	43.10	32.2	6.29	40.10
13.63 +13.59			49.53 +49.52			12.29 +12.25			11.86 +11.82			20.43 +20.41		
0 ^h 56 ^m 38 ^s .823			1 ^h 28 ^m 19 ^s .01			4 ^h 8 ^m 52 ^s .234			5 ^h 33 ^m 57 ^s .736			7 ^h 0 ^m 7 ^s .12		
+85° 47' 27".59			+88° 50' 29".36			+85° 19' 32".98			+85° 9' 21".38			+87° 11' 16".00		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
May	0 56	+85 47	May	1 26	+88 50	May	4 8	+85 19	May	5 33	+85 9	May	6 59	+87 11
	s	"		s	"		s	"		s	"		s	"
1.9	17.59	25.57	1.9	59.39	30.97	1.1	38.89	49.85	1.1	50.79	43.35	1.2	66.67	40.25
2.9	17.75	25.29	2.9	59.84	30.66	2.1	38.81	49.56	2.1	50.63	43.10	2.2	66.29	40.10
3.9	17.94	25.01	3.9	60.37	30.35	3.1	38.73	49.25	3.1	50.47	42.85	3.2	65.90	39.92
4.9	18.13	24.75	4.9	60.97	30.06	4.1	38.67	48.92	4.1	50.33	42.57	4.2	65.52	39.74
5.9	18.35	24.51	5.9	61.63	29.78	5.1	38.64	48.58	5.1	50.19	42.28	5.2	65.16	39.52
6.9	18.58	24.28	6.9	62.32	29.52	6.1	38.62	48.25	6.1	50.09	41.98	6.2	64.82	39.30
7.9	18.80	24.09	7.9	63.01	29.29	7.0	38.63	47.93	7.1	50.00	41.68	7.2	64.52	39.06
8.9	19.02	23.91	8.9	63.69	29.08	8.0	38.64	47.63	8.1	49.93	41.40	8.2	64.25	38.84
9.9	19.23	23.74	9.9	64.30	28.87	9.0	38.66	47.34	9.1	49.87	41.14	9.2	64.01	38.62
10.9	19.41	23.57	10.9	64.86	28.68	10.0	38.68	47.08	10.1	49.80	40.89	10.2	63.78	38.43
11.9	19.58	23.39	11.9	65.35	28.48	11.0	38.69	46.84	11.1	49.73	40.66	11.2	63.55	38.25
12.9	19.75	23.21	12.9	65.83	28.26	12.0	38.68	46.61	12.1	49.65	40.44	12.2	63.31	38.08
13.9	19.92	23.01	13.9	66.32	28.02	13.0	38.65	46.35	13.1	49.56	40.22	13.2	63.04	37.92
14.9	20.10	22.78	14.9	66.87	27.77	14.0	38.63	46.09	14.1	49.46	39.99	14.1	62.75	37.75
15.9	20.31	22.55	15.9	67.52	27.51	15.0	38.61	45.80	15.1	49.35	39.73	15.1	62.43	37.55
16.9	20.56	22.33	16.9	68.25	27.25	16.0	38.60	45.49	16.1	49.25	39.44	16.1	62.11	37.32
17.9	20.82	22.12	17.9	69.07	27.01	17.0	38.62	45.15	17.1	49.17	39.13	17.1	61.81	37.08
18.9	21.09	21.94	18.9	69.96	26.78	18.0	38.66	44.80	18.1	49.10	38.80	18.1	61.52	36.81
19.9	21.38	21.78	19.9	70.86	26.57	19.0	38.71	44.47	19.1	49.05	38.47	19.1	61.27	36.52
20.9	21.65	21.64	20.9	71.76	26.39	20.0	38.78	44.15	20.1	49.02	38.15	20.1	61.05	36.23
21.9	21.91	21.52	21.9	72.61	26.22	21.0	38.85	43.85	21.1	49.00	37.84	21.1	60.86	35.94
22.9	22.17	21.41	22.9	73.41	26.08	22.0	38.94	43.57	22.1	48.99	37.55	22.1	60.69	35.67
23.9	22.40	21.29	23.9	74.17	25.92	23.0	39.01	43.31	23.1	48.98	37.27	23.1	60.52	35.43
24.9	22.61	21.17	24.9	74.88	25.76	24.0	39.08	43.06	24.1	48.97	37.01	24.1	60.36	35.20
25.9	22.82	21.04	25.9	75.56	25.59	24.9	39.14	42.81	25.1	48.95	36.77	25.1	60.18	34.98
26.9	23.05	20.90	26.9	76.26	25.41	25.9	39.19	42.56	26.1	48.92	36.52	26.1	59.99	34.76
27.9	23.28	20.75	27.9	76.98	25.22	26.9	39.23	42.29	27.1	48.89	36.27	27.1	59.79	34.55
28.9	23.51	20.59	28.9	77.74	25.02	27.9	39.27	42.01	28.0	48.85	36.01	28.1	59.57	34.31
29.9	23.77	20.43	29.9	78.56	24.82	28.9	39.31	41.72	29.0	48.80	35.71	29.1	59.35	34.06
30.8	24.05	20.29	30.9	79.46	24.62	29.9	39.37	41.42	30.0	48.76	35.40	30.1	59.12	33.80
31.8	24.35	20.14	31.9	80.42	24.44	30.9	39.45	41.11	31.0	48.73	35.08	31.1	58.90	33.51
32.8	24.66	20.02	32.9	81.45	24.26	31.9	39.54	40.79	32.0	48.71	34.74	32.1	58.71	33.19
13.62 +13.58			49.44 +49.43			12.28 +12.24			11.85 +11.81			20.43 +20.40		
0 ^h 56 ^m 38 ^s .823			1 ^h 28 ^m 19 ^s .01			4 ^h 8 ^m 52 ^s .234			5 ^h 33 ^m 57 ^s .736			7 ^h 0 ^m 7 ^s .12		
+85° 47' 27".59			+88° 50' 29".36			+85° 19' 32".98			+85° 9' 21".38			+87° 11' 16".00		

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
June	h m 0 56	° ' +85 47	June	h m 1 27	° ' +88 50	June	h m 4 8	° ' +85 19	June	h m 5 33	° ' +85 9	June	h m 6 50	° ' +87 11
	s "	"		s "	"		s "	"		s "	"		s "	"
1.8	24.66	20.02	1.9	21.45	24.26	1.9	39.65	40.46	1.0	48.71	34.74	1.1	58.71	33.19
2.8	24.98	19.91	2.9	22.50	24.11	2.9	39.78	40.15	2.0	48.73	34.39	2.1	58.54	32.87
3.8	25.29	19.84	3.9	23.58	23.98	3.9	39.93	39.86	3.0	48.76	34.06	3.1	58.40	32.54
4.8	25.60	19.78	4.9	24.63	23.89	4.9	40.08	39.59	4.0	48.81	33.73	4.1	58.29	32.21
5.8	25.89	19.75	5.9	25.62	23.80	5.9	40.23	39.35	5.0	48.86	33.42	5.1	58.22	31.90
6.8	26.16	19.72	6.9	26.55	23.73	6.9	40.37	39.12	6.0	48.93	33.13	6.1	58.17	31.60
7.8	26.42	19.69	7.8	27.40	23.65	7.9	40.50	38.90	7.0	48.99	32.86	7.1	58.12	31.33
8.8	26.66	19.64	8.8	28.23	23.57	8.9	40.62	38.69	8.0	49.04	32.61	8.1	58.07	31.08
9.8	26.91	19.58	9.8	29.05	23.46	9.9	40.74	38.46	9.0	49.08	32.36	9.1	58.00	30.83
10.8	27.16	19.51	10.8	29.89	23.34	10.9	40.84	38.22	10.0	49.11	32.11	10.1	57.89	30.58
11.8	27.43	19.42	11.8	30.80	23.21	11.9	40.96	37.94	11.0	49.13	31.84	11.1	57.78	30.32
12.8	27.73	19.34	12.8	31.80	23.07	12.9	41.08	37.65	12.0	49.15	31.53	12.1	57.66	30.03
13.8	28.05	19.26	13.8	32.89	22.95	13.9	41.22	37.36	13.0	49.18	31.21	13.1	57.54	29.72
14.8	28.39	19.21	14.8	34.05	22.84	14.9	41.40	37.06	14.0	49.22	30.87	14.1	57.43	29.39
15.8	28.74	19.18	15.8	35.24	22.75	15.9	41.59	36.79	15.0	49.30	30.52	15.1	57.35	29.04
16.8	29.08	19.18	16.8	36.43	22.70	16.9	41.80	36.53	15.9	49.38	30.18	16.1	57.32	28.68
17.8	29.40	19.19	17.8	37.57	22.66	17.9	42.00	36.29	16.9	49.49	29.86	17.1	57.31	28.33
18.8	29.71	19.22	18.8	38.65	22.64	18.9	42.21	36.07	17.9	49.60	29.56	18.1	57.33	27.99
19.8	30.00	19.26	19.8	39.67	22.63	19.9	42.40	35.88	18.9	49.72	29.27	19.0	57.36	27.68
20.8	30.27	19.30	20.8	40.64	22.62	20.9	42.59	35.69	19.9	49.84	29.01	20.0	57.40	27.39
21.8	30.54	19.32	21.8	41.58	22.59	21.9	42.76	35.49	20.9	49.95	28.76	21.0	57.44	27.11
22.8	30.80	19.33	22.8	42.50	22.56	22.9	42.92	35.29	21.9	50.05	28.51	22.0	57.46	26.84
23.8	31.07	19.33	23.8	43.43	22.51	23.9	43.08	35.09	22.9	50.14	28.26	23.0	57.46	26.56
24.8	31.34	19.33	24.8	44.39	22.46	24.9	43.24	34.87	23.9	50.23	28.01	24.0	57.45	26.28
25.8	31.64	19.32	25.8	45.41	22.40	25.9	43.41	34.63	24.9	50.30	27.74	25.0	57.43	26.00
26.8	31.94	19.31	26.8	46.48	22.34	26.9	43.60	34.38	25.9	50.39	27.46	26.0	57.42	25.69
27.8	32.27	19.31	27.8	47.61	22.29	27.9	43.80	34.13	26.9	50.48	27.16	27.0	57.40	25.36
28.8	32.61	19.34	28.8	48.80	22.25	28.9	44.01	33.89	27.9	50.59	26.85	28.0	57.40	25.02
29.8	32.96	19.37	29.8	50.03	22.23	29.9	44.25	33.65	28.9	50.71	26.52	29.0	57.41	24.66
30.8	33.30	19.43	30.8	51.27	22.25	30.9	44.50	33.43	29.9	50.84	26.20	30.0	57.46	24.30
31.8	33.65	19.53	31.8	52.49	22.28	31.9	44.76	33.22	30.9	51.00	25.89	31.0	57.55	23.94
32.8	33.96	19.64	32.8	53.67	22.34	32.9	45.01	33.05	31.9	51.18	25.60	32.0	57.67	23.58
13.62 +13.58			49.38 +49.37			12.27 +12.23			11.85 +11.81			20.41 +20.38		
0 ^h 56 ^m 38 ^s .823			1 ^h 28 ^m 19 ^s .01			4 ^h 8 ^m 52 ^s .234			5 ^h 33 ^m 57 ^s .736			7 ^h 0 ^m 7 ^s .12		
+85° 47' 27".59			+88° 50' 29".36			+85° 19' 32".98			+85° 9' 21".38			+87° 11' 16".00		

APPARENT PLACES OF CIRCUMPOLAR STARS

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43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
July	0 56	+85 47	July	1 27	+88 50	July	4 8	+85 19	July	5 33	+85 9	July	6 59	+87 11
	s	"		s	"		s	"		s	"		s	"
1.8	33.65	19.53	1.8	52.49	22.28	1.9	44.76	33.22	1.9	51.18	25.60	1.0	57.55	23.94
2.8	33.96	19.64	2.8	53.67	22.34	2.9	45.01	33.05	2.9	51.37	25.33	2.0	57.67	23.58
3.8	34.27	19.77	3.8	54.78	22.41	3.9	45.27	32.90	3.9	51.55	25.09	3.0	57.83	23.25
4.8	34.55	19.90	4.8	55.81	22.48	4.9	45.51	32.77	4.9	51.72	24.86	4.0	57.99	22.94
5.8	34.82	20.01	5.8	56.79	22.55	5.9	45.74	32.65	5.9	51.89	24.65	5.0	58.15	22.64
6.7	35.08	20.11	6.8	57.72	22.60	6.9	45.96	32.52	6.9	52.04	24.44	6.0	58.29	22.39
7.7	35.34	20.19	7.8	58.68	22.64	7.9	46.17	32.37	7.9	52.19	24.21	6.9	58.42	22.12
8.7	35.63	20.26	8.8	59.68	22.68	8.9	46.37	32.21	8.9	52.32	23.97	7.9	58.53	21.84
9.7	35.93	20.32	9.8	60.76	22.68	9.9	46.59	32.02	9.9	52.46	23.70	8.9	58.61	21.54
10.7	36.25	20.38	10.8	61.91	22.70	10.9	46.83	31.82	10.9	52.62	23.41	9.9	58.68	21.23
11.7	36.58	20.47	11.8	63.14	22.73	11.9	47.09	31.61	11.9	52.79	23.11	10.9	58.78	20.88
12.7	36.93	20.58	12.8	64.39	22.78	12.9	47.36	31.42	12.9	52.98	22.81	11.9	58.90	20.53
13.7	37.28	20.72	13.8	65.66	22.87	13.9	47.65	31.25	13.9	53.19	22.54	12.9	59.04	20.17
14.7	37.61	20.88	14.7	66.88	22.97	14.9	47.94	31.10	14.9	53.41	22.28	13.9	59.23	19.81
15.7	37.92	21.06	15.7	68.06	23.10	15.9	48.24	30.98	15.9	53.64	22.03	14.9	59.45	19.46
16.7	38.22	21.24	16.7	69.16	23.23	16.9	48.52	30.88	16.9	53.87	21.82	15.9	59.69	19.14
17.7	38.50	21.42	17.7	70.19	23.36	17.9	48.80	30.79	17.9	54.09	21.63	16.9	59.93	18.84
18.7	38.75	21.60	18.7	71.18	23.49	18.8	49.06	30.71	18.9	54.30	21.45	17.9	60.17	18.55
19.7	39.00	21.77	19.7	72.14	23.61	19.8	49.31	30.62	19.9	54.49	21.26	18.9	60.39	18.28
20.7	39.25	21.92	20.7	73.10	23.72	20.8	49.56	30.52	20.9	54.68	21.07	19.9	60.60	18.01
21.7	39.52	22.06	21.7	74.06	23.82	21.8	49.81	30.42	21.9	54.87	20.86	20.9	60.80	17.74
22.7	39.79	22.20	22.7	75.07	23.91	22.8	50.05	30.29	22.9	55.06	20.64	21.9	60.99	17.47
23.7	40.07	22.33	23.7	76.11	24.00	23.8	50.30	30.16	23.9	55.25	20.41	22.9	61.16	17.19
24.7	40.37	22.48	24.7	77.22	24.08	24.8	50.57	30.03	24.9	55.45	20.18	23.9	61.34	16.90
25.7	40.68	22.64	25.7	78.38	24.18	25.8	50.84	29.89	25.9	55.67	19.94	24.9	61.53	16.58
26.7	41.00	22.81	26.7	79.57	24.30	26.8	51.15	29.76	26.9	55.89	19.69	25.9	61.73	16.24
27.7	41.32	23.02	27.7	80.79	24.44	27.8	51.46	29.64	27.9	56.14	19.44	26.9	61.97	15.90
28.7	41.64	23.23	28.7	82.00	24.62	28.8	51.78	29.55	28.9	56.40	19.21	27.9	62.25	15.57
29.7	41.94	23.47	29.7	83.16	24.81	29.8	52.11	29.49	29.9	56.68	19.01	28.9	62.55	15.24
30.7	42.23	23.73	30.7	84.25	25.02	30.8	52.44	29.45	30.9	56.96	18.84	29.9	62.88	14.93
31.7	42.48	24.00	31.7	85.26	25.24	31.8	52.75	29.44	31.9	57.24	18.68	30.9	63.23	14.63
32.7	42.72	24.25	32.7	86.20	25.47	32.8	53.06	29.43	32.9	57.50	18.55	31.9	63.59	14.37
13.62 +13.58			49.39 +49.38			12.27 +12.23			11.84 +11.80			20.39 +20.36		
0 ^h 56 ^m 38 ^s .823			1 ^h 28 ^m 19 ^s .01			4 ^h 8 ^m 52 ^s .234			5 ^h 33 ^m 57 ^s .736			7 ^h 0 ^m 7 ^s .12		
+85° 47' 27".59			+88° 50' 29".36			+85° 19' 32".98			+85° 9' 21".38			+87° 11' 16".00		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m ° ' "			h m ° ' "			h m ° ' "			h m ° ' "			h m ° ' "	
Aug.	0 56	+85 47	Aug.	1 28	+88 50	Aug.	4 8	+85 19	Aug.	5 33	+85 9	Aug.	7 0	+87 11
	s	"		s	"		s	"		s	"		s	"
1.7	42.72	24.25	1.7	26.20	25.47	1.8	53.06	29.43	1.9	57.50	18.55	1.9	3.93	14.13
2.7	42.94	24.50	2.7	27.08	25.67	2.8	53.34	29.42	2.9	57.75	18.43	2.9	4.25	13.90
3.7	43.17	24.74	3.7	27.96	25.86	3.8	53.61	29.40	3.9	57.98	18.29	3.9	4.55	13.67
4.7	43.40	24.94	4.7	28.85	26.02	4.8	53.87	29.36	4.9	58.22	18.14	4.9	4.83	13.42
5.7	43.64	25.14	5.7	29.81	26.18	5.8	54.14	29.30	5.9	58.44	17.97	5.9	5.09	13.16
6.7	43.91	25.34	6.7	30.85	26.34	6.8	54.43	29.22	6.9	58.67	17.78	6.9	5.37	12.87
7.7	44.21	25.55	7.7	31.95	26.50	7.8	54.73	29.14	7.9	58.92	17.57	7.9	5.66	12.56
8.7	44.50	25.79	8.7	33.10	26.69	8.8	55.06	29.07	8.9	59.19	17.37	8.9	5.98	12.24
9.7	44.80	26.04	9.7	34.27	26.89	9.8	55.40	29.01	9.8	59.48	17.17	9.9	6.33	11.93
10.7	45.08	26.32	10.7	35.41	27.13	10.8	55.75	28.98	10.8	59.78	16.99	10.9	6.71	11.63
11.7	45.36	26.63	11.7	36.49	27.38	11.8	56.09	28.98	11.8	60.08	16.84	11.9	7.12	11.36
12.6	45.60	26.94	12.7	37.49	27.65	12.8	56.43	28.99	12.8	60.39	16.72	12.9	7.53	11.10
13.6	45.83	27.24	13.7	38.42	27.92	13.8	56.75	29.03	13.8	60.68	16.61	13.9	7.95	10.87
14.6	46.03	27.53	14.7	39.29	28.17	14.8	57.05	29.07	14.8	60.97	16.52	14.9	8.35	10.66
15.6	46.23	27.83	15.7	40.10	28.43	15.8	57.34	29.12	15.8	61.24	16.43	15.9	8.74	10.45
16.6	46.43	28.10	16.7	40.90	28.68	16.8	57.63	29.15	16.8	61.50	16.35	16.9	9.10	10.25
17.6	46.63	28.37	17.7	41.70	28.90	17.8	57.90	29.17	17.8	61.77	16.26	17.9	9.46	10.04
18.6	46.83	28.62	18.7	42.53	29.12	18.8	58.18	29.18	18.8	62.03	16.14	18.9	9.80	9.82
19.6	47.04	28.87	19.7	43.39	29.33	19.8	58.45	29.18	19.8	62.28	16.02	19.9	10.14	9.59
20.6	47.26	29.12	20.6	44.30	29.55	20.8	58.75	29.18	20.8	62.54	15.89	20.9	10.49	9.35
21.6	47.50	29.39	21.6	45.25	29.77	21.8	59.06	29.17	21.8	62.81	15.76	21.9	10.85	9.10
22.6	47.74	29.67	22.6	46.23	30.01	22.8	59.38	29.17	22.8	63.09	15.61	22.9	11.22	8.83
23.6	48.00	29.97	23.6	47.24	30.26	23.8	59.72	29.17	23.8	63.39	15.47	23.9	11.63	8.55
24.6	48.25	30.29	24.6	48.26	30.54	24.7	60.07	29.20	24.8	63.71	15.34	24.9	12.07	8.29
25.6	48.49	30.65	25.6	49.24	30.86	25.7	60.42	29.25	25.8	64.04	15.24	25.9	12.55	8.04
26.6	48.70	31.01	26.6	50.15	31.18	26.7	60.77	29.33	26.8	64.38	15.16	26.9	13.05	7.82
27.6	48.90	31.38	27.6	50.99	31.52	27.7	61.11	29.43	27.8	64.72	15.12	27.9	13.54	7.62
28.6	49.06	31.73	28.6	51.74	31.85	28.7	61.43	29.54	28.8	65.03	15.09	28.9	14.03	7.44
29.6	49.21	32.09	29.6	52.43	32.18	29.7	61.73	29.66	29.8	65.33	15.08	29.9	14.51	7.29
30.6	49.36	32.44	30.6	53.07	32.50	30.7	62.03	29.78	30.8	65.62	15.06	30.8	14.96	7.14
31.6	49.50	32.75	31.6	53.71	32.79	31.7	62.31	29.88	31.8	65.91	15.03	31.8	15.39	6.98
32.6	49.65	33.05	32.6	54.40	33.05	32.7	62.58	29.96	32.8	66.19	14.98	32.8	15.80	6.81
13.63 +13.59			49.45 +49.44			12.27 +12.23			11.84 +11.80			20.36 +20.34		
0 ^h 56 ^m 38 ^s .823			1 ^h 28 ^m 19 ^s .01			4 ^h 8 ^m 52 ^s .234			5 ^h 33 ^m 57 ^s .736			7 ^h 0 ^m 7 ^s .12		
+85° 47' 27".59			+88° 50' 29".36			+85° 19' 32".98			+85° 9' 21".38			+87° 11' 16".00		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Sept.	h m 0 56	° ' " +85 47	Sept.	h m 1 28	° ' " +88 50	Sept.	h m 4 9	° ' " +85 19	Sept.	h m 5 34	° ' " +85 9	Sept.	h m 7 0	° ' " +87 11
	s "	"		s "	"		s "	"		s "	"		s "	"
1.6	49.65	33.05	1.6	54.40	33.05	1.7	2.58	29.96	1.8	6.19	14.98	1.8	15.80	6.81
2.6	49.83	33.35	2.6	55.16	33.32	2.7	2.88	30.02	2.8	6.47	14.90	2.8	16.20	6.61
3.6	50.02	33.66	3.6	55.98	33.60	3.7	3.18	30.07	3.8	6.77	14.82	3.8	16.61	6.40
4.6	50.23	33.97	4.6	56.87	33.88	4.7	3.51	30.12	4.8	7.07	14.73	4.8	17.06	6.17
5.6	50.45	34.32	5.6	57.78	34.18	5.7	3.85	30.18	5.8	7.40	14.64	5.8	17.53	5.95
6.6	50.65	34.68	6.6	58.67	34.51	6.7	4.19	30.27	6.8	7.74	14.56	6.8	18.03	5.73
7.6	50.85	35.06	7.6	59.51	34.86	7.7	4.53	30.37	7.8	8.09	14.52	7.8	18.56	5.53
8.6	51.02	35.45	8.6	60.27	35.23	8.7	4.86	30.52	8.8	8.43	14.50	8.8	19.09	5.36
9.6	51.16	35.85	9.6	60.94	35.60	9.7	5.19	30.67	9.8	8.76	14.51	9.8	19.62	5.22
10.6	51.29	36.24	10.6	61.54	35.96	10.7	5.51	30.84	10.8	9.09	14.53	10.8	20.15	5.08
11.6	51.39	36.62	11.6	62.08	36.32	11.7	5.80	31.01	11.8	9.40	14.56	11.8	20.66	4.97
12.6	51.49	36.98	12.6	62.59	36.66	12.7	6.07	31.17	12.8	9.69	14.59	12.8	21.14	4.87
13.6	51.59	37.33	13.6	63.08	36.99	13.7	6.35	31.33	13.8	9.98	14.62	13.8	21.62	4.77
14.6	51.69	37.67	14.6	63.58	37.30	14.7	6.62	31.47	14.7	10.26	14.65	14.8	22.08	4.66
15.6	51.81	38.00	15.6	64.12	37.61	15.7	6.89	31.60	15.7	10.54	14.66	15.8	22.52	4.53
16.6	51.92	38.32	16.6	64.70	37.92	16.7	7.18	31.73	16.7	10.83	14.65	16.8	22.96	4.40
17.5	52.06	38.65	17.6	65.32	38.22	17.7	7.47	31.85	17.7	11.12	14.64	17.8	23.42	4.25
18.5	52.21	38.99	18.6	65.98	38.54	18.7	7.76	31.97	18.7	11.42	14.62	18.8	23.89	4.10
19.5	52.36	39.34	19.6	66.68	38.86	19.7	8.08	32.09	19.7	11.73	14.60	19.8	24.39	3.93
20.5	52.51	39.72	20.6	67.36	39.22	20.7	8.41	32.24	20.7	12.06	14.59	20.8	24.91	3.77
21.5	52.64	40.12	21.6	68.01	39.59	21.7	8.73	32.40	21.7	12.41	14.60	21.8	25.45	3.62
22.5	52.76	40.54	22.6	68.62	39.98	22.7	9.06	32.58	22.7	12.76	14.63	22.8	26.03	3.50
23.5	52.86	40.97	23.6	69.15	40.39	23.7	9.37	32.80	23.7	13.11	14.70	23.8	26.62	3.41
24.5	52.92	41.39	24.6	69.57	40.81	24.7	9.67	33.03	24.7	13.44	14.78	24.8	27.19	3.33
25.5	52.98	41.81	25.5	69.92	41.22	25.7	9.96	33.27	25.7	13.77	14.88	25.8	27.76	3.28
26.5	53.01	42.20	26.5	70.22	41.61	26.7	10.21	33.51	26.7	14.08	14.99	26.8	28.30	3.25
27.5	53.05	42.57	27.5	70.51	41.98	27.7	10.46	33.73	27.7	14.37	15.09	27.8	28.81	3.22
28.5	53.09	42.93	28.5	70.82	42.33	28.7	10.71	33.94	28.7	14.65	15.18	28.8	29.30	3.16
29.5	53.15	43.27	29.5	71.18	42.66	29.6	10.97	34.12	29.7	14.93	15.24	29.8	29.78	3.10
30.5	53.22	43.62	30.5	71.61	43.00	30.6	11.23	34.29	30.7	15.22	15.29	30.8	30.26	3.01
31.5	53.32	43.98	31.5	72.11	43.34	31.6	11.52	34.46	31.7	15.52	15.32	31.8	30.75	2.90
13.63	+13.60		49.56	+49.55		12.27	+12.23		11.84	+11.80		20.36	+20.33	
0 ^h 56 ^m	38°.823		1 ^h 28 ^m	19°.01		4 ^h 8 ^m	52°.234		5 ^h 33 ^m	57°.736		7 ^h 0 ^m	7°.12	
+85° 47'	27''.59		+88° 50'	29''.36		+85° 19'	32''.98		+85° 9'	21''.38		+87° 11'	16''.00	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cep Mag. 5.	
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.
Oct.	h m 0 56	° ' +85 47	Oct.	h m 1 29	° ' +88 50	Oct.	h m 4 9	° ' +85 19	Oct.	h m 5 34	° ' +85 9	Oct.	h m 7 0
	s s	"		s s	"		s s	"		s s	"		s s
1.5	53.32	43.98	1.5	12.11	43.34	1.6	11.52	34.46	1.7	15.52	15.32	1.8	30.75
2.5	53.42	44.36	2.5	12.64	43.71	2.6	11.82	34.64	2.7	15.84	15.36	2.8	31.27
3.5	53.52	44.76	3.5	13.16	44.09	3.6	12.12	34.84	3.7	16.18	15.41	3.8	31.82
4.5	53.61	45.18	4.5	13.64	44.49	4.6	12.43	35.05	4.7	16.52	15.49	4.8	32.40
5.5	53.67	45.60	5.5	14.05	44.91	5.6	12.73	35.30	5.7	16.86	15.58	5.8	33.00
6.5	53.71	46.03	6.5	14.37	45.33	6.6	13.01	35.57	6.7	17.19	15.71	6.7	33.59
7.5	53.73	46.45	7.5	14.60	45.75	7.6	13.28	35.85	7.7	17.51	15.85	7.7	34.18
8.5	53.72	46.86	8.5	14.76	46.16	8.6	13.54	36.14	8.7	17.82	16.00	8.7	34.74
9.5	53.71	47.25	9.5	14.87	46.55	9.6	13.78	36.41	9.7	18.11	16.17	9.7	35.29
10.5	53.69	47.63	10.5	14.96	46.94	10.6	14.00	36.67	10.7	18.39	16.32	10.7	35.81
11.5	53.67	47.99	11.5	15.05	47.30	11.6	14.20	36.93	11.7	18.66	16.46	11.7	36.30
12.5	53.66	48.35	12.5	15.17	47.66	12.6	14.42	37.17	12.7	18.92	16.60	12.7	36.79
13.5	53.66	48.70	13.5	15.32	48.01	13.6	14.64	37.40	13.7	19.18	16.71	13.7	37.28
14.5	53.67	49.04	14.5	15.51	48.35	14.6	14.86	37.62	14.7	19.45	16.82	14.7	37.76
15.5	53.70	49.39	15.5	15.74	48.70	15.6	15.09	37.84	15.7	19.72	16.92	15.7	38.24
16.5	53.72	49.74	16.5	16.00	49.05	16.6	15.34	38.06	16.7	20.02	17.03	16.7	38.75
17.5	53.75	50.13	17.5	16.26	49.43	17.6	15.59	38.30	17.7	20.32	17.14	17.7	39.29
18.5	53.77	50.53	18.5	16.50	49.82	18.6	15.85	38.54	18.7	20.63	17.27	18.7	39.86
19.5	53.78	50.94	19.5	16.70	50.24	19.6	16.11	38.82	19.7	20.95	17.42	19.7	40.43
20.5	53.76	51.37	20.5	16.82	50.66	20.6	16.37	39.13	20.7	21.26	17.58	20.7	41.02
21.5	53.72	51.79	21.5	16.85	51.10	21.6	16.61	39.45	21.6	21.57	17.79	21.7	41.61
22.5	53.66	52.21	22.5	16.79	51.53	22.6	16.83	39.78	22.6	21.87	18.01	22.7	42.19
23.5	53.57	52.61	23.5	16.66	51.95	23.6	17.02	40.12	23.6	22.15	18.25	23.7	42.74
24.4	53.49	53.00	24.5	16.50	52.34	24.6	17.20	40.45	24.6	22.42	18.46	24.7	43.26
25.4	53.40	53.35	25.5	16.35	52.71	25.6	17.38	40.75	25.6	22.66	18.68	25.7	43.76
26.4	53.33	53.68	26.5	16.23	53.05	26.6	17.55	41.04	26.6	22.89	18.88	26.7	44.24
27.4	53.29	54.01	27.5	16.19	53.40	27.6	17.73	41.31	27.6	23.13	19.04	27.7	44.70
28.4	53.26	54.34	28.5	16.21	53.74	28.6	17.92	41.57	28.6	23.38	19.20	28.7	45.18
29.4	53.24	54.69	29.5	16.28	54.10	29.6	18.13	41.83	29.6	23.64	19.34	29.7	45.68
30.4	53.22	55.07	30.5	16.36	54.47	30.6	18.35	42.10	30.6	23.92	19.50	30.7	46.21
31.4	53.18	55.46	31.5	16.40	54.87	31.6	18.58	42.39	31.6	24.21	19.68	31.7	46.76
32.4	53.13	55.87	32.4	16.39	55.29	32.6	18.80	42.70	32.6	24.49	19.88	32.7	47.33
13.64 +13.61 0 ^h 56 ^m 38 ^s .823 +85° 47' 27''.59			49.69 +49.68 1 ^h 28 ^m 19 ^s .01 +88° 50' 29''.36			12.28 +12.23 4 ^h 8 ^m 52 ^s .234 +85° 19' 32''.98			11.84 +11.80 5 ^h 33 ^m 57 ^s .736 +85° 9' 21''.38			20.36 + 7 ^h 0 ^m +87° 11' 1	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

48 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '	Nov.	h m	° '
	0 56	+85 47		1 29	+88 50		4 9	+85 19		5 34	+85 9		7 0	+87 11
	s	"		s	"		s	"		s	"		s	"
1.4	53.13	55.87	1.4	16.39	55.29	1.6	18.80	42.70	1.6	24.49	19.88	1.7	47.33	3.14
2.4	53.05	56.27	2.4	16.28	55.71	2.6	19.01	43.04	2.6	24.78	20.11	2.7	47.90	3.23
3.4	52.95	56.68	3.4	16.08	56.13	3.6	19.20	43.40	3.6	25.05	20.36	3.7	48.46	3.35
4.4	52.83	57.07	4.4	15.81	56.54	4.6	19.37	43.76	4.6	25.32	20.62	4.7	49.00	3.48
5.4	52.69	57.43	5.4	15.48	56.93	5.5	19.52	44.12	5.6	25.56	20.89	5.7	49.52	3.64
6.4	52.55	57.77	6.4	15.11	57.29	6.5	19.66	44.46	6.6	25.79	21.16	6.7	50.00	3.79
7.4	52.40	58.10	7.4	14.73	57.65	7.5	19.78	44.80	7.6	26.00	21.43	7.7	50.46	3.94
8.4	52.27	58.42	8.4	14.37	57.99	8.5	19.89	45.12	8.6	26.21	21.68	8.7	50.91	4.08
9.4	52.15	58.71	9.4	14.03	58.32	9.5	20.01	45.43	9.6	26.40	21.92	9.7	51.33	4.22
10.4	52.03	59.01	10.4	13.74	58.63	10.5	20.13	45.73	10.6	26.60	22.14	10.7	51.75	4.34
11.4	51.94	59.31	11.4	13.50	58.95	11.5	20.26	46.02	11.6	26.81	22.35	11.7	52.19	4.46
12.4	51.84	59.62	12.4	13.27	59.28	12.5	20.40	46.30	12.6	27.02	22.56	12.6	52.64	4.56
13.4	51.74	59.93	13.4	13.07	59.63	13.5	20.55	46.59	13.6	27.24	22.78	13.6	53.11	4.66
14.4	51.65	60.27	14.4	12.85	59.99	14.5	20.71	46.91	14.6	27.47	23.00	14.6	53.60	4.77
15.4	51.54	60.63	15.4	12.59	60.36	15.5	20.86	47.24	15.6	27.71	23.24	15.6	54.10	4.90
16.4	51.42	60.99	16.4	12.27	60.75	16.5	21.02	47.60	16.6	27.96	23.51	16.6	54.62	5.04
17.4	51.26	61.35	17.4	11.87	61.14	17.5	21.15	47.97	17.6	28.19	23.80	17.6	55.14	5.21
18.4	51.09	61.71	18.4	11.38	61.53	18.5	21.27	48.36	18.6	28.41	24.11	18.6	55.64	5.42
19.4	50.88	62.04	19.4	10.80	61.90	19.5	21.37	48.75	19.6	28.62	24.43	19.6	56.12	5.63
20.4	50.67	62.36	20.4	10.18	62.25	20.5	21.44	49.13	20.6	28.80	24.77	20.6	56.58	5.86
21.4	50.47	62.64	21.4	9.54	62.57	21.5	21.51	49.50	21.6	28.96	25.08	21.6	56.99	6.08
22.4	50.28	62.91	22.4	8.93	62.87	22.5	21.56	49.84	22.6	29.10	25.38	22.6	57.38	6.30
23.4	50.11	63.17	23.4	8.38	63.16	23.5	21.62	50.15	23.6	29.25	25.64	23.6	57.75	6.49
24.4	49.96	63.42	24.4	7.91	63.45	24.5	21.69	50.44	24.6	29.41	25.90	24.6	58.12	6.66
25.4	49.82	63.67	25.4	7.50	63.73	25.5	21.78	50.74	25.6	29.57	26.14	25.6	58.52	6.81
26.4	49.69	63.95	26.4	7.11	64.04	26.5	21.87	51.04	26.6	29.75	26.37	26.6	58.92	6.95
27.4	49.53	64.25	27.4	6.71	64.36	27.5	21.98	51.35	27.5	29.94	26.62	27.6	59.36	7.12
28.4	49.37	64.56	28.4	6.26	64.70	28.5	22.08	51.69	28.5	30.13	26.90	28.6	59.81	7.30
29.3	49.19	64.87	29.4	5.73	65.05	29.5	22.18	52.05	29.5	30.33	27.21	29.6	60.27	7.50
30.3	48.98	65.18	30.4	5.11	65.39	30.5	22.25	52.44	30.5	30.51	27.53	30.6	60.73	7.73
31.3	48.75	65.48	31.4	4.40	65.73	31.5	22.31	52.82	31.5	30.68	27.87	31.6	61.15	7.99
13.65	+13.62		49.83	+49.82		12.28	+12.24		11.84	+11.80		20.36	+20.33	
0 ^h 56 ^m	38 ^s .823		1 ^h 28 ^m	19 ^s .01		4 ^h 8 ^m	52 ^s .234		5 ^h 33 ^m	57 ^s .736		7 ^h 0 ^m	7 ^s .12	
+85° 47'	27'' .59		+88° 50'	29'' .36		+85° 19'	32'' .98		+85° 9'	21'' .38		+87° 11'	16'' .00	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

43 H. Cephei. Mag. 4.5			α Ursæ Minoris. (Polaris.) Mag. 2.1			Groombridge 750. Mag. 6.7			Groombridge 944. Mag. 6.4			51 H. Cephei. Mag. 5.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Dec.	0 56	+85 48	Dec.	1 28	+88 51	Dec.	4 9	+85 19	Dec.	5 34	+85 9	Dec.	7 1	+87 11
	s	"		s	"		s	"		s	"		s	"
1.3	48.75	5.48	1.4	64.40	5.73	1.5	22.31	52.82	1.5	30.68	27.87	1.6	1.15	7.99
2.3	48.50	5.76	2.4	63.63	6.05	2.5	22.33	53.20	2.5	30.82	28.22	2.6	1.55	8.25
3.3	48.25	6.01	3.4	62.81	6.34	3.5	22.35	53.59	3.5	30.94	28.58	3.6	1.92	8.52
4.3	48.01	6.25	4.4	61.99	6.62	4.5	22.35	53.96	4.5	31.04	28.92	4.6	2.26	8.80
5.3	47.77	6.46	5.4	61.19	6.88	5.5	22.34	54.30	5.5	31.14	29.25	5.6	2.57	9.07
6.3	47.53	6.66	6.4	60.40	7.12	6.5	22.33	54.62	6.5	31.23	29.56	6.6	2.86	9.32
7.3	47.32	6.85	7.4	59.66	7.35	7.5	22.32	54.93	7.5	31.32	29.85	7.6	3.15	9.56
8.3	47.11	7.03	8.3	58.95	7.58	8.5	22.32	55.23	8.5	31.40	30.14	8.6	3.45	9.80
9.3	46.92	7.21	9.3	58.29	7.80	9.5	22.33	55.53	9.5	31.50	30.42	9.6	3.74	10.02
10.3	46.73	7.41	10.3	57.64	8.04	10.5	22.35	55.83	10.5	31.61	30.69	10.6	4.04	10.24
11.3	46.52	7.63	11.3	57.00	8.29	11.5	22.37	56.14	11.5	31.72	30.97	11.6	4.35	10.46
12.3	46.31	7.86	12.3	56.34	8.56	12.4	22.40	56.46	12.5	31.85	31.27	12.6	4.69	10.68
13.3	46.09	8.09	13.3	55.64	8.83	13.4	22.42	56.81	13.5	31.97	31.58	13.6	5.04	10.93
14.3	45.85	8.32	14.3	54.86	9.11	14.4	22.43	57.17	14.5	32.09	31.92	14.6	5.40	11.20
15.3	45.58	8.56	15.3	53.99	9.40	15.4	22.43	57.55	15.5	32.19	32.27	15.6	5.75	11.49
16.3	45.29	8.78	16.3	53.04	9.67	16.4	22.40	57.93	16.5	32.28	32.63	16.6	6.07	11.81
17.3	44.99	8.97	17.3	52.03	9.92	17.4	22.35	58.31	17.5	32.34	33.00	17.6	6.35	12.13
18.3	44.69	9.13	18.3	50.99	10.14	18.4	22.29	58.67	18.5	32.38	33.38	18.6	6.60	12.46
19.3	44.41	9.26	19.3	49.98	10.33	19.4	22.21	58.99	19.5	32.41	33.73	19.5	6.82	12.79
20.3	44.14	9.39	20.3	49.03	10.49	20.4	22.13	59.29	20.5	32.43	34.05	20.5	7.01	13.09
21.3	43.91	9.49	21.3	48.14	10.64	21.4	22.06	59.57	21.5	32.45	34.34	21.5	7.19	13.36
22.3	43.68	9.60	22.3	47.33	10.81	22.4	22.00	59.84	22.5	32.49	34.62	22.5	7.37	13.62
23.3	43.47	9.72	23.3	46.57	10.97	23.4	21.96	60.10	23.5	32.53	34.89	23.5	7.57	13.85
24.3	43.25	9.86	24.3	45.81	11.15	24.4	21.93	60.38	24.5	32.58	35.17	24.5	7.80	14.09
25.3	43.00	10.01	25.3	45.02	11.35	25.4	21.90	60.68	25.5	32.65	35.47	25.5	8.05	14.35
26.3	42.75	10.17	26.3	44.17	11.55	26.4	21.86	61.00	26.5	32.70	35.78	26.5	8.31	14.63
27.3	42.48	10.34	27.3	43.24	11.76	27.4	21.81	61.33	27.5	32.76	36.13	27.5	8.56	14.93
28.3	42.18	10.49	28.3	42.23	11.97	28.4	21.73	61.67	28.5	32.79	36.48	28.5	8.79	15.25
29.3	41.88	10.62	29.3	41.15	12.15	29.4	21.63	62.02	29.5	32.81	36.86	29.5	9.00	15.59
30.3	41.56	10.73	30.3	40.03	12.32	30.4	21.51	62.35	30.5	32.81	37.22	30.5	9.18	15.94
31.3	41.24	10.81	31.3	38.89	12.45	31.4	21.38	62.66	31.5	32.79	37.58	31.5	9.32	16.30
32.3	40.94	10.88	32.3	37.77	12.56	32.4	21.24	62.96	32.5	32.75	37.92	32.5	9.43	16.64
13.66 +13.62			49.94 +49.93			12.29 +12.25			11.85 +11.81			20.37 +20.35		
0 ^h 56 ^m 38 ^s .823			1 ^h 28 ^m 19 ^s .01			4 ^h 8 ^m 52 ^s .234			5 ^h 33 ^m 57 ^s .736			7 ^h 0 ^m 7 ^s .12		
+85° 47' 27".59			+88° 50' 29".36			+85° 19' 32".98			+85° 9' 21".38			+87° 11' 16".00		



APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Feb.	8 13	+88 53	Feb.	9 24	+81 42	Feb.	10 20	+83 0	Feb.	12 15	+88 10	Feb	15 5	+87 33
	s	"		s	"		s	"		s	"		s	"
1.5	15.69	53.38	1.5	59.37	44.03	1.6	49.29	0.25	1.6	10.45	37.74	1.8	4.32	38.61
2.5	15.77	53.69	2.5	59.43	44.30	2.6	49.40	0.48	2.6	11.04	37.87	2.8	4.79	38.52
3.5	15.85	54.01	3.5	59.49	44.58	3.6	49.51	0.73	3.6	11.66	38.01	3.8	5.30	38.42
4.5	15.90	54.35	4.5	59.55	44.88	4.6	49.62	1.00	4.6	12.30	38.17	4.8	5.83	38.34
5.5	15.88	54.70	5.5	59.61	45.20	5.6	49.73	1.29	5.6	12.95	38.35	5.8	6.39	38.26
6.5	15.79	55.06	6.5	59.66	45.53	6.6	49.83	1.60	6.6	13.58	38.56	6.7	6.95	38.21
7.5	15.63	55.42	7.5	59.69	45.87	7.5	49.92	1.93	7.6	14.19	38.78	7.7	7.53	38.17
8.5	15.39	55.78	8.5	59.72	46.21	8.5	50.00	2.25	8.6	14.76	39.01	8.7	8.09	38.17
9.5	15.07	56.11	9.5	59.73	46.54	9.5	50.06	2.56	9.6	15.27	39.26	9.7	8.65	38.19
10.5	14.71	56.43	10.5	59.73	46.86	10.5	50.11	2.88	10.6	15.75	39.51	10.7	9.19	38.23
11.4	14.32	56.74	11.5	59.73	47.17	11.5	50.15	3.19	11.6	16.18	39.76	11.7	9.68	38.27
12.4	13.94	57.02	12.5	59.73	47.45	12.5	50.18	3.47	12.6	16.58	39.99	12.7	10.15	38.31
13.4	13.59	57.28	13.5	59.74	47.72	13.5	50.22	3.74	13.6	16.96	40.21	13.7	10.59	38.35
14.4	13.29	57.55	14.5	59.74	47.98	14.5	50.26	3.98	14.6	17.35	40.41	14.7	11.02	38.37
15.4	13.05	57.80	15.5	59.75	48.23	15.5	50.31	4.22	15.6	17.77	40.60	15.7	11.45	38.37
16.4	12.86	58.07	16.5	59.77	48.49	16.5	50.37	4.48	16.6	18.22	40.78	16.7	11.90	38.37
17.4	12.67	58.37	17.5	59.80	48.77	17.5	50.44	4.75	17.6	18.71	40.97	17.7	12.38	38.34
18.4	12.47	58.68	18.5	59.83	49.08	18.5	50.51	5.03	18.6	19.23	41.17	18.7	12.90	38.32
19.4	12.20	59.02	19.5	59.85	49.40	19.5	50.58	5.35	19.6	19.76	41.41	19.7	13.45	38.33
20.4	11.84	59.36	20.5	59.85	49.74	20.5	50.63	5.68	20.6	20.27	41.67	20.7	14.01	38.36
21.4	11.37	59.69	21.5	59.85	50.08	21.5	50.67	6.03	21.6	20.74	41.95	21.7	14.57	38.42
22.4	10.82	60.01	22.5	59.83	50.42	22.5	50.69	6.37	22.6	21.15	42.25	22.7	15.11	38.51
23.4	10.20	60.29	23.5	59.80	50.74	23.5	50.70	6.71	23.6	21.49	42.55	23.7	15.61	38.64
24.4	9.55	60.55	24.5	59.76	51.04	24.5	50.69	7.02	24.6	21.77	42.84	24.7	16.09	38.76
25.4	8.90	60.78	25.5	59.72	51.32	25.5	50.69	7.31	25.6	22.02	43.12	25.7	16.52	38.88
26.4	8.29	61.01	26.5	59.69	51.58	26.5	50.67	7.59	26.6	22.25	43.38	26.7	16.94	39.00
27.4	7.73	61.22	27.5	59.65	51.82	27.5	50.67	7.84	27.6	22.50	43.62	27.7	17.33	39.10
28.4	7.21	61.44	28.5	59.62	52.07	28.5	50.68	8.11	28.6	22.78	43.87	28.7	17.74	39.20
29.4	6.71	61.68	29.4	59.60	52.33	29.5	50.69	8.38	29.6	23.08	44.11	29.7	18.18	39.28
30.4	6.21	61.94	30.4	59.58	52.61	30.5	50.70	8.66	30.6	23.40	44.36	30.7	18.62	39.37
52.06	+52.05		6.94	+6.87		8.21	+8.15		31.45	+31.43		23.49	+23.47	
8 ^h 11 ^m	46 ^s .151		9 ^h 24 ^m	46 ^s .516		10 ^h 20 ^m	34 ^s .492		12 ^h 14 ^m	26 ^s .979		15 ^h 4 ^m	59 ^s .30	
+88° 53'	44''.41		+81° 42'	44''.16		+83° 0'	6''.83		+88° 10'	55''.87		+87° 34'	6''.01	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Mar.	8 12	+88 54	Mar.	9 24	+81 42	Mar.	10 20	+83 0	Mar.	12 15	+88 10	Mar.	15 5	+87 33
	s	"		s	"		s	"		s	"		s	"
1.4	66.71	1.68	1.4	59.60	52.33	1.5	50.69	8.38	1.6	23.08	44.11	1.7	18.18	39.28
2.4	66.21	1.94	2.4	59.58	52.61	2.5	50.70	8.66	2.6	23.40	44.36	2.7	18.62	39.37
3.4	65.70	2.20	3.4	59.55	52.90	3.5	50.71	8.96	3.6	23.75	44.63	3.7	19.10	39.45
4.4	65.14	2.48	4.4	59.53	53.21	4.5	50.72	9.28	4.6	24.10	44.92	4.7	19.61	39.55
5.4	64.52	2.76	5.4	59.50	53.54	5.5	50.73	9.61	5.6	24.43	45.22	5.7	20.11	39.66
6.4	63.84	3.04	6.4	59.46	53.86	6.5	50.73	9.95	6.6	24.75	45.53	6.7	20.62	39.79
7.4	63.07	3.33	7.4	59.41	54.19	7.5	50.71	10.30	7.6	25.03	45.86	7.7	21.13	39.95
8.4	62.24	3.59	8.4	59.35	54.50	8.5	50.68	10.64	8.5	25.27	46.20	8.7	21.62	40.13
9.4	61.36	3.84	9.4	59.28	54.81	9.5	50.64	10.97	9.5	25.45	46.54	9.7	22.09	40.33
10.4	60.46	4.05	10.4	59.20	55.09	10.5	50.59	11.29	10.5	25.59	46.88	10.7	22.51	40.54
11.4	59.55	4.25	11.4	59.12	55.35	11.5	50.53	11.60	11.5	25.68	47.20	11.7	22.91	40.74
12.4	58.66	4.43	12.4	59.04	55.60	12.5	50.47	11.88	12.5	25.75	47.50	12.7	23.27	40.94
13.4	57.82	4.59	13.4	58.96	55.82	13.5	50.41	12.13	13.5	25.81	47.80	13.7	23.60	41.14
14.4	57.05	4.74	14.4	58.89	56.03	14.5	50.36	12.38	14.5	25.88	48.06	14.7	23.93	41.31
15.4	56.34	4.91	15.4	58.83	56.25	15.5	50.32	12.62	15.5	25.98	48.33	15.6	24.26	41.47
16.4	55.65	5.10	16.4	58.78	56.48	16.4	50.29	12.88	16.5	26.11	48.58	16.6	24.62	41.63
17.4	54.99	5.29	17.4	58.72	56.72	17.4	50.26	13.15	17.5	26.28	48.85	17.6	25.00	41.77
18.4	54.30	5.50	18.4	58.67	56.99	18.4	50.23	13.44	18.5	26.46	49.13	18.6	25.41	41.92
19.4	53.52	5.73	19.4	58.61	57.27	19.4	50.20	13.74	19.5	26.64	49.44	19.6	25.85	42.10
20.3	52.65	5.94	20.4	58.54	57.55	20.4	50.15	14.06	20.5	26.79	49.76	20.6	26.28	42.30
21.3	51.68	6.15	21.4	58.45	57.83	21.4	50.08	14.39	21.5	26.88	50.11	21.6	26.70	42.54
22.3	50.64	6.33	22.4	58.35	58.09	22.4	50.00	14.70	22.5	26.89	50.46	22.6	27.08	42.79
23.3	49.58	6.49	23.4	58.24	58.32	23.4	49.91	14.99	23.5	26.85	50.79	23.6	27.42	43.07
24.3	48.51	6.61	24.4	58.13	58.54	24.4	49.81	15.25	24.5	26.77	51.12	24.6	27.71	43.34
25.3	47.48	6.72	25.4	58.02	58.72	25.4	49.71	15.50	25.5	26.65	51.42	25.6	27.98	43.60
26.3	46.51	6.81	26.4	57.92	58.90	26.4	49.61	15.72	26.5	26.53	51.71	26.6	28.22	43.85
27.3	45.59	6.89	27.4	57.82	59.06	27.4	49.52	15.94	27.5	26.43	51.99	27.6	28.46	44.08
28.3	44.72	6.99	28.4	57.73	59.23	28.4	49.44	16.15	28.5	26.36	52.25	28.6	28.71	44.30
29.3	43.86	7.10	29.4	57.64	59.42	29.4	49.37	16.37	29.5	26.32	52.52	29.6	28.98	44.52
30.3	43.01	7.23	30.4	57.56	59.62	30.4	49.30	16.61	30.5	26.31	52.81	30.6	29.28	44.73
31.3	42.13	7.36	31.4	57.48	59.84	31.4	49.23	16.87	31.5	26.31	53.11	31.6	29.60	44.95
32.3	41.19	7.51	32.4	57.39	60.06	32.4	49.15	17.14	32.5	26.30	53.41	32.6	29.92	45.19
52.15	+52.15		6.94	+6.87		8.21	+8.15		31.50	+31.47		23.50	+23.48	
8 ^h 11 ^m	46 ^s .151		9 ^h 24 ^m	46 ^s .516		10 ^h 20 ^m	34 ^s .492		12 ^h 14 ^m	26 ^s .979		15 ^h 4 ^m	59 ^s .30	
+88° 53'	44''-41		+81° 42'	44''-16		+83° 0'	6''-83		+88° 10'	55''-87		+87° 34'	6''-01	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Apr.	h m s	° '	Apr.	h m s	° '	Apr.	h m s	° '	Apr.	h m s	° '	Apr.	h m s	° '
	8 12	+88 54		9 24	+81 43		10 20	+83 0		12 15	+88 10		15 5	+87 33
1.3	41.19	7.51	1.4	57.39	0.06	1.4	49.15	17.14	1.5	26.30	53.41	1.6	29.92	45.19
2.3	40.21	7.66	2.4	57.29	0.29	2.4	49.06	17.41	2.5	26.27	53.74	2.6	30.25	45.44
3.3	39.16	7.80	3.4	57.18	0.51	3.4	48.97	17.68	3.5	26.21	54.07	3.6	30.57	45.71
4.3	38.06	7.92	4.4	57.07	0.73	4.4	48.87	17.95	4.5	26.11	54.41	4.6	30.87	46.00
5.3	36.91	8.03	5.4	56.94	0.94	5.4	48.75	18.22	5.5	25.95	54.76	5.6	31.15	46.31
6.3	35.73	8.11	6.4	56.81	1.12	6.4	48.62	18.47	6.5	25.75	55.10	6.6	31.39	46.62
7.3	34.56	8.16	7.3	56.68	1.28	7.4	48.49	18.70	7.5	25.51	55.42	7.6	31.60	46.95
8.3	33.40	8.20	8.3	56.54	1.42	8.4	48.35	18.91	8.5	25.22	55.72	8.6	31.76	47.26
9.3	32.29	8.22	9.3	56.41	1.54	9.4	48.21	19.09	9.5	24.92	56.01	9.6	31.90	47.57
10.3	31.26	8.24	10.3	56.28	1.63	10.4	48.08	19.26	10.5	24.63	56.27	10.6	32.02	47.85
11.3	30.30	8.25	11.3	56.17	1.73	11.4	47.96	19.41	11.5	24.38	56.52	11.6	32.14	48.12
12.3	29.41	8.26	12.3	56.07	1.83	12.4	47.85	19.57	12.5	24.15	56.75	12.6	32.28	48.37
13.3	28.53	8.29	13.3	55.97	1.95	13.4	47.75	19.74	13.5	23.98	56.99	13.6	32.43	48.61
14.3	27.65	8.35	14.3	55.87	2.08	14.4	47.65	19.92	14.4	23.82	57.24	14.6	32.61	48.85
15.3	26.72	8.41	15.3	55.77	2.24	15.4	47.55	20.13	15.4	23.66	57.51	15.6	32.81	49.11
16.3	25.71	8.47	16.3	55.67	2.40	16.4	47.44	20.35	16.4	23.48	57.81	16.6	33.02	49.39
17.3	24.61	8.53	17.3	55.55	2.56	17.4	47.32	20.57	17.4	23.25	58.11	17.6	33.23	49.70
18.3	23.46	8.55	18.3	55.41	2.69	18.4	47.18	20.78	18.4	22.96	58.42	18.6	33.39	50.03
19.3	22.26	8.56	19.3	55.26	2.80	19.4	47.02	20.98	19.4	22.61	58.73	19.6	33.51	50.37
20.3	21.07	8.52	20.3	55.11	2.89	20.4	46.86	21.14	20.4	22.19	59.02	20.5	33.59	50.71
21.3	19.91	8.48	21.3	54.96	2.95	21.3	46.69	21.28	21.4	21.75	59.28	21.5	33.62	51.05
22.3	18.81	8.41	22.3	54.82	2.99	22.3	46.53	21.40	22.4	21.32	59.52	22.5	33.63	51.37
23.3	17.78	8.33	23.3	54.69	3.02	23.3	46.38	21.50	23.4	20.88	59.73	23.5	33.62	51.67
24.3	16.82	8.26	24.3	54.57	3.05	24.3	46.24	21.59	24.4	20.47	59.95	24.5	33.62	51.96
25.2	15.91	8.20	25.3	54.45	3.09	25.3	46.10	21.68	25.4	20.10	60.15	25.5	33.64	52.23
26.2	15.00	8.16	26.3	54.34	3.14	26.3	45.97	21.80	26.4	19.76	60.36	26.5	33.68	52.50
27.2	14.09	8.13	27.3	54.22	3.20	27.3	45.84	21.92	27.4	19.44	60.59	27.5	33.74	52.76
28.2	13.15	8.10	28.3	54.11	3.28	28.3	45.72	22.05	28.4	19.12	60.82	28.5	33.82	53.04
29.2	12.16	8.08	29.3	53.98	3.36	29.3	45.60	22.19	29.4	18.79	61.06	29.5	33.90	53.32
30.2	11.13	8.06	30.3	53.85	3.44	30.3	45.46	22.34	30.4	18.44	61.32	30.5	33.98	53.63
31.2	10.04	8.03	31.3	53.72	3.51	31.3	45.31	22.49	31.4	18.06	61.57	31.5	34.05	53.96
52.20 +52.19 8 ^h 11 ^m 46 ^s .151 +88° 53' 44''.41			6.94 +6.87 9 ^h 24 ^m 46 ^s .516 +81° 42' 44''.16			8.21 +8.15 10 ^h 20 ^m 34 ^s .492 +83° 0' 6''.83			31.53 +31.52 12 ^h 14 ^m 26 ^s .979 +88° 10' 55''.87			23.52 +23.50 15 ^h 4 ^m 59 ^s .30 +87° 34' 6''.01		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			80 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2288. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
May	8 11	+88 54	May	9 24	+81 43	May	10 20	+83 0	May	12 15	+88 11	May	15 5	+87 33
	s	"		s	"		s	"		s	"		s	"
1.2	70.04	8.03	1.3	53.72	3.51	1.3	45.31	22.49	1.4	18.06	1.57	1.5	34.05	53.96
2.2	68.92	7.98	2.3	53.58	3.56	2.3	45.15	22.63	2.4	17.62	1.83	2.5	34.08	54.30
3.2	67.77	7.90	3.3	53.43	3.61	3.3	44.99	22.75	3.4	17.15	2.09	3.5	34.09	54.64
4.2	66.63	7.80	4.3	53.27	3.63	4.3	44.82	22.85	4.4	16.63	2.33	4.5	34.05	54.99
5.2	65.51	7.68	5.3	53.12	3.63	5.3	44.65	22.92	5.4	16.07	2.55	5.5	33.98	55.34
6.2	64.44	7.54	6.3	52.98	3.60	6.3	44.47	22.97	6.4	15.50	2.75	6.5	33.87	55.68
7.2	63.46	7.38	7.3	52.84	3.56	7.3	44.29	23.00	7.4	14.93	2.92	7.5	33.74	55.99
8.2	62.54	7.22	8.3	52.70	3.50	8.3	44.14	23.02	8.4	14.39	3.07	8.5	33.60	56.29
9.2	61.71	7.07	9.3	52.58	3.44	9.3	43.99	23.03	9.4	13.88	3.21	9.5	33.46	56.56
10.2	60.91	6.93	10.3	52.47	3.40	10.3	43.85	23.05	10.4	13.40	3.34	10.5	33.36	56.81
11.2	60.14	6.82	11.3	52.37	3.37	11.3	43.72	23.09	11.4	12.96	3.49	11.5	33.28	57.06
12.2	59.34	6.71	12.3	52.26	3.37	12.3	43.60	23.14	12.4	12.55	3.65	12.5	33.23	57.31
13.2	58.50	6.62	13.3	52.15	3.36	13.3	43.47	23.21	13.4	12.13	3.82	13.5	33.19	57.59
14.2	57.57	6.52	14.2	52.03	3.37	14.3	43.33	23.28	14.4	11.68	4.01	14.5	33.14	57.89
15.2	56.59	6.41	15.2	51.89	3.36	15.3	43.17	23.35	15.4	11.17	4.21	15.5	33.06	58.20
16.2	55.55	6.26	16.2	51.75	3.33	16.3	42.99	23.40	16.4	10.60	4.40	16.5	32.95	58.53
17.2	54.51	6.09	17.2	51.60	3.28	17.3	42.81	23.43	17.4	9.98	4.58	17.5	32.79	58.86
18.2	53.51	5.89	18.2	51.45	3.20	18.3	42.62	23.43	18.4	9.32	4.74	18.5	32.59	59.20
19.2	52.57	5.67	19.2	51.31	3.10	19.3	42.45	23.40	19.4	8.65	4 87	19.5	32.36	59.51
20.2	51.72	5.44	20.2	51.18	2.97	20.3	42.28	23.35	20.3	7.98	4.97	20.5	32.10	59.80
21.2	50.94	5.22	21.2	51.06	2.84	21.3	42.12	23.29	21.3	7.35	5.06	21.5	31.86	60.07
22.2	50.22	5.00	22.2	50.94	2.72	22.3	41.97	23.23	22.3	6.76	5.13	22.5	31.62	60.32
23.2	49.55	4.81	23.2	50.84	2.61	23.3	41.83	23.19	23.3	6.20	5.21	23.5	31.40	60.56
24.2	48.89	4.62	24.2	50.74	2.51	24.3	41.70	23.15	24.3	5.68	5.29	24.5	31.21	60.80
25.2	48.20	4.44	25.2	50.64	2.43	25.3	41.56	23.12	25.3	5.16	5.40	25.5	31.02	61.05
26.2	47.48	4.28	26.2	50.53	2.36	26.3	41.43	23.11	26.3	4.65	5.50	26.5	30.85	61.30
27.2	46.72	4.12	27.2	50.42	2.28	27.3	41.28	23.09	27.3	4.12	5.62	27.4	30.68	61.56
28.2	45.92	3.95	28.2	50.30	2.21	28.2	41.13	23.09	28.3	3.57	5.74	28.4	30.50	61.84
29.2	45.08	3.76	29.2	50.18	2.13	29.2	40.97	23.07	29.3	2.97	5.86	29.4	30.31	62.13
30.2	44.22	3.56	30.2	50.05	2.03	30.2	40.81	23.04	30.3	2.33	5.98	30.4	30.08	62.43
31.2	43.36	3.32	31.2	49.92	1.91	31.2	40.64	23.00	31.3	1.67	6.09	31.4	29.82	62.73
32.1	42.52	3.07	32.2	49.79	1.76	32.2	40.46	22.92	32.3	0.96	6.18	32.4	29.53	63.04
52.17	+52.17		6.94	+6.87		8.21	+8.15		31.56	+31.55		23.55	+23.53	
8 ^h 11 ^m	46 ^s .151		9 ^h 24 ^m	46 ^s .516		10 ^h 20 ^m	34 ^s .492		12 ^h 14 ^m	26 ^s .979		15 ^h 4 ^m	59 ^s .30	
+88° 53'	44'' .41		+81° 42'	44'' .16		+83° 0'	6'' .83		+88° 10'	55'' .87		+87° 34'	6'' .01	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			80 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
June	h m 8 11	° ' +88 53	June	h m 9 24	° ' +81 42	June	h m 10 20	° ' +83 0	June	h m 12 14	° ' +88 11	June	h m 15 5	° ' +87 34
	s s	" "		s s	" "		s s	" "		s s	" "		s s	" "
1.1	42.52	63.07	1.2	49.79	61.76	1.2	40.46	22.92	1.3	60.96	6.18	1.4	29.53	3.04
2.1	41.73	62.81	2.2	49.66	61.59	2.2	40.29	22.82	2.3	60.23	6.25	2.4	29.20	3.32
3.1	41.02	62.53	3.2	49.54	61.41	3.2	40.12	22.70	3.3	59.50	6.30	3.4	28.84	3.59
4.1	40.41	62.24	4.2	49.43	61.20	4.2	39.96	22.57	4.3	58.80	6.31	4.4	28.47	3.83
5.1	39.88	61.96	5.2	49.33	61.00	5.2	39.82	22.42	5.3	58.13	6.32	5.4	28.11	4.04
6.1	39.44	61.69	6.2	49.24	60.79	6.2	39.69	22.28	6.3	57.51	6.31	6.4	27.76	4.23
7.1	39.02	61.45	7.2	49.16	60.62	7.2	39.57	22.15	7.3	56.94	6.30	7.4	27.44	4.41
8.1	38.59	61.22	8.2	49.08	60.46	8.2	39.46	22.04	8.3	56.39	6.30	8.4	27.15	4.59
9.1	38.13	61.00	9.2	49.00	60.31	9.2	39.35	21.95	9.3	55.85	6.32	9.4	26.89	4.79
10.1	37.59	60.79	10.2	48.91	60.18	10.2	39.22	21.86	10.3	55.29	6.35	10.4	26.61	5.00
11.1	36.98	60.57	11.2	48.81	60.04	11.2	39.08	21.78	11.3	54.70	6.40	11.4	26.33	5.23
12.1	36.34	60.32	12.2	48.70	59.88	12.2	38.93	21.69	12.3	54.05	6.44	12.4	26.03	5.49
13.1	35.68	60.04	13.2	48.59	59.70	13.2	38.77	21.58	13.3	53.34	6.48	13.4	25.67	5.74
14.1	35.04	59.73	14.2	48.47	59.49	14.2	38.60	21.43	14.3	52.59	6.50	14.4	25.28	6.00
15.1	34.46	59.41	15.2	48.36	59.26	15.2	38.44	21.25	15.3	51.82	6.49	15.4	24.85	6.24
16.1	33.99	59.08	16.2	48.26	59.00	16.2	38.28	21.06	16.3	51.08	6.45	16.4	24.39	6.46
17.1	33.58	58.74	17.2	48.17	58.73	17.2	38.14	20.85	17.3	50.36	6.39	17.4	23.93	6.66
18.1	33.25	58.42	18.2	48.10	58.47	18.2	38.02	20.65	18.3	49.68	6.31	18.4	23.47	6.82
19.1	32.99	58.12	19.1	48.03	58.22	19.2	37.90	20.45	19.3	49.03	6.24	19.4	23.05	6.98
20.1	32.74	57.82	20.1	47.97	57.99	20.2	37.79	20.27	20.3	48.43	6.17	20.4	22.64	7.12
21.1	32.50	57.55	21.1	47.91	57.77	21.2	37.68	20.09	21.3	47.86	6.10	21.4	22.26	7.26
22.1	32.22	57.28	22.1	47.85	57.55	22.2	37.57	19.93	22.3	47.30	6.04	22.4	21.89	7.41
23.1	31.90	57.02	23.1	47.77	57.35	23.2	37.47	19.77	23.3	46.72	6.00	23.4	21.54	7.57
24.1	31.57	56.77	24.1	47.71	57.16	24.2	37 35	19.62	24.3	46.14	5.96	24.4	21.19	7.74
25.1	31.19	56.49	25.1	47.63	56.96	25.2	37.23	19.46	25.3	45.52	5.93	25.4	20.82	7.93
26.1	30.80	56.21	26.1	47.55	56.74	26.2	37.10	19.30	26.2	44.87	5.90	26.4	20.42	8.12
27.1	30.39	55.90	27.1	47.46	56.50	27.2	36.96	19.12	27.2	44.18	5.86	27.4	20.00	8.31
28.1	29.99	55.57	28.1	47.37	56.24	28.2	36.83	18.92	28.2	43.46	5.80	28.4	19.54	8.51
29.1	29.63	55.23	29.1	47.28	55.95	29.2	36.70	18.69	29.2	42.73	5.72	29.4	19.04	8.69
30.1	29.34	54.87	30.1	47.21	55.67	30.2	36.57	18.44	30.2	41.99	5.61	30.4	18.52	8.85
31.1	29.15	54.50	31.1	47.14	55.35	31.2	36.44	18.18	31.2	41.27	5.48	31.4	17.99	8.98
52.08 +52.07 8 ^h 11 ^m 46 ^s .151 +88° 53' 44''.41			6.94 +6.87 9 ^h 24 ^m 46 ^s .516 +81° 42' 44''.16			8.21 +8.15 10 ^h 20 ^m 34 ^s .492 +83° 0' 6''.83			31.58 +31.56 12 ^h 14 ^m 26 ^s .979 +88° 10' 55''.87			23.57 +23.55 15 ^h 4 ^m 59 ^s .30 +87° 34' 6''.01		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Greenbridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Greenbridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
July	8 11	+88 53	July	9 24	+81 42	July	10 20	+83 0	July	12 14	+88 10	July	15 5	+87 34
	s	"		s	"		s	"		s	"		s	"
1.1	29.15	54.50	1.1	47.14	55.35	1.2	36.44	18.18	1.2	41.27	65.48	1.4	17.99	8.98
2.1	29.08	54.14	2.1	47.08	55.04	2.2	36.33	17.90	2.2	40.59	65.32	2.3	17.45	9.10
3.1	29.06	53.79	3.1	47.04	54.73	3.1	36.25	17.62	3.2	39.95	65.17	3.3	16.93	9.19
4.1	29.11	53.46	4.1	47.01	54.44	4.1	36.17	17.35	4.2	39.37	65.00	4.3	16.43	9.26
5.1	29.20	53.15	5.1	46.98	54.17	5.1	36.09	17.10	5.2	38.83	64.85	5.3	15.97	9.32
6.1	29.25	52.85	6.1	46.96	53.91	6.1	36.02	16.87	6.2	38.32	64.71	6.3	15.53	9.39
7.0	29.23	52.57	7.1	46.92	53.66	7.1	35.95	16.65	7.2	37.78	64.58	7.3	15.11	9.48
8.0	29.15	52.29	8.1	46.87	53.41	8.1	35.86	16.44	8.2	37.22	64.47	8.3	14.70	9.58
9.0	29.00	52.00	9.1	46.82	53.15	9.1	35.76	16.23	9.2	36.62	64.36	9.3	14.25	9.70
10.0	28.81	51.67	10.1	46.76	52.88	10.1	35.65	16.00	10.2	35.98	64.26	10.3	13.78	9.83
11.0	28.64	51.32	11.1	46.70	52.59	11.1	35.53	15.74	11.2	35.30	64.13	11.3	13.25	9.96
12.0	28.52	50.95	12.1	46.64	52.25	12.1	35.42	15.45	12.2	34.58	63.98	12.3	12.69	10.08
13.0	28.49	50.56	13.1	46.59	51.92	13.1	35.31	15.14	13.2	33.87	63.80	13.3	12.09	10.19
14.0	28.56	50.17	14.1	46.55	51.57	14.1	35.21	14.82	14.2	33.18	63.59	14.3	11.51	10.26
15.0	28.73	49.79	15.1	46.52	51.22	15.1	35.13	14.50	15.2	32.54	63.37	15.3	10.94	10.32
16.0	28.95	49.42	16.1	46.51	50.88	16.1	35.06	14.17	16.2	31.95	63.15	16.3	10.38	10.35
17.0	29.20	49.08	17.1	46.49	50.56	17.1	35.00	13.86	17.2	31.40	62.93	17.3	9.86	10.37
18.0	29.45	48.76	18.1	46.49	50.24	18.1	34.95	13.57	18.2	30.90	62.72	18.3	9.36	10.38
19.0	29.68	48.45	19.1	46.49	49.95	19.1	34.90	13.29	19.2	30.42	62.51	19.3	8.88	10.39
20.0	29.87	48.15	20.1	46.48	49.66	20.1	34.85	13.02	20.2	29.94	62.33	20.3	8.41	10.41
21.0	30.04	47.85	21.1	46.46	49.38	21.1	34.79	12.76	21.2	29.45	62.15	21.3	7.94	10.45
22.0	30.17	47.54	22.1	46.44	49.11	22.1	34.73	12.50	22.2	28.93	61.97	22.3	7.47	10.49
23.0	30.28	47.23	23.1	46.42	48.83	23.1	34.66	12.23	23.2	28.38	61.79	23.3	6.98	10.54
24.0	30.38	46.90	24.1	46.39	48.52	24.1	34.59	11.95	24.2	27.81	61.62	24.3	6.47	10.60
25.0	30.49	46.56	25.1	46.36	48.20	25.1	34.51	11.66	25.2	27.20	61.43	25.3	5.93	10.67
25.9	30.62	46.20	26.0	46.33	47.85	26.1	34.43	11.34	26.2	26.58	61.22	26.3	5.36	10.72
26.9	30.81	45.81	27.0	46.31	47.49	27.1	34.36	11.00	27.2	25.94	60.99	27.3	4.75	10.75
27.9	31.08	45.43	28.0	46.30	47.13	28.1	34.29	10.64	28.2	25.32	60.73	28.3	4.14	10.77
28.9	31.45	45.04	29.0	46.31	46.75	29.1	34.24	10.28	29.2	24.74	60.45	29.3	3.52	10.75
29.9	31.91	44.67	30.0	46.32	46.36	30.1	34.20	9.91	30.2	24.21	60.16	30.3	2.91	10.70
30.9	32.44	44.31	31.0	46.35	45.99	31.1	34.17	9.54	31.2	23.72	59.86	31.3	2.33	10.64
31.9	33.01	43.97	32.0	46.38	45.65	32.1	34.16	9.19	32.1	23.28	59.55	32.3	1.78	10.56
51.96	+51.95		6.94	+6.87		8.21	+8.15		31.56	+31.54		23.58	+23.56	
8 ^h 11 ^m	46 ^s .151		9 ^h 24 ^m	46 ^s .516		10 ^h 20 ^m	34 ^s .492		12 ^h 14 ^m	26 ^s .979		15 ^h 4 ^m	59 ^s .30	
+88° 53'	44'''.41		+81° 42'	44'''.16		+83° 0'	6'''.83		+88° 10'	55'''.87		+87° 34'	6'''.01	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Aug	h m s	° ' "	Aug.	h m s	° ' "	Aug.	h m s	° ' "	Aug.	h m s	° ' "	Aug.	h m s	° ' "
	8 11	+88 53	Aug.	9 24	+81 42	Aug.	10 20	+82 59	Aug.	12 14	+88 10	Aug.	15 4	+87 34
1.9	33.57	43.66	1.0	46.38	45.65	1.1	34.16	69.19	1.1	23.28	59.55	1.3	61.78	10.56
2.9	34.09	43.38	2.0	46.41	45.33	2.1	34.15	68.86	2.1	22.89	59.28	2.3	61.27	10.49
3.9	34.55	43.10	3.0	46.44	45.03	3.1	34.14	68.55	3.1	22.51	59.00	3.3	60.78	10.42
4.9	34.95	42.80	4.0	46.46	44.73	4.1	34.13	68.25	4.1	22.11	58.76	4.3	60.31	10.38
5.9	35.29	42.48	5.0	46.47	44.42	5.1	34.10	67.95	5.1	21.67	58.53	5.3	59.81	10.35
6.9	35.61	42.15	6.0	46.48	44.10	6.1	34.05	67.65	6.1	21.18	58.29	6.3	59.29	10.34
7.9	35.95	41.79	7.0	46.48	43.77	7.1	34.00	67.32	7.1	20.66	58.04	7.3	58.73	10.33
8.9	36.36	41.42	8.0	46.48	43.42	8.1	33.95	66.97	8.1	20.11	57.77	8.2	58.14	10.32
9.9	36.85	41.04	9.0	46.49	43.04	9.0	33.91	66.60	9.1	19.54	57.48	9.2	57.52	10.30
10.9	37.44	40.66	10.0	46.51	42.65	10.0	33.88	66.22	10.1	19.01	57.17	10.2	56.89	10.24
11.9	38.12	40.29	11.0	46.54	42.25	11.0	33.85	65.82	11.1	18.50	56.84	11.2	56.26	10.16
12.9	38.86	39.96	12.0	46.58	41.86	12.0	33.84	65.43	12.1	18.07	56.50	12.2	55.66	10.05
13.9	39.61	39.63	12.9	46.62	41.49	13.0	33.85	65.04	13.1	17.67	56.15	13.2	55.09	9.92
14.9	40.35	39.34	13.9	46.68	41.14	14.0	33.86	64.67	14.1	17.33	55.81	14.2	54.55	9.79
15.9	41.05	39.05	14.9	46.74	40.80	15.0	33.87	64.32	15.1	17.00	55.49	15.2	54.03	9.66
16.9	41.70	38.78	15.9	46.79	40.48	16.0	33.89	63.99	16.1	16.69	55.18	16.2	53.53	9.53
17.9	42.32	38.50	16.9	46.84	40.18	17.0	33.90	63.67	17.1	16.38	54.88	17.2	53.04	9.42
18.9	42.90	38.21	17.9	46.88	39.87	18.0	33.92	63.35	18.1	16.06	54.59	18.2	52.56	9.32
19.9	43.45	37.92	18.9	46.92	39.56	19.0	33.93	63.04	19.1	15.71	54.31	19.2	52.08	9.24
20.9	44.01	37.60	19.9	46.96	39.24	20.0	33.92	62.71	20.1	15.32	54.03	20.2	51.56	9.16
21.9	44.60	37.28	20.9	46.99	38.91	21.0	33.91	62.37	21.1	14.93	53.74	21.2	51.02	9.08
22.9	45.24	36.94	21.9	47.02	38.56	22.0	33.90	62.00	22.1	14.50	53.43	22.2	50.45	9.00
23.9	45.93	36.59	22.9	47.06	38.19	23.0	33.88	61.63	23.1	14.07	53.10	23.2	49.87	8.91
24.9	46.70	36.24	23.9	47.11	37.81	24.0	33.88	61.24	24.1	13.64	52.75	24.2	49.27	8.79
25.9	47.56	35.90	24.9	47.16	37.42	25.0	33.89	60.84	25.1	13.24	52.38	25.2	48.66	8.65
26.9	48.51	35.57	25.9	47.23	37.03	26.0	33.91	60.43	26.1	12.90	52.00	26.2	48.06	8.47
27.9	49.50	35.27	26.9	47.31	36.65	26.9	33.96	60.01	27.1	12.60	51.60	27.2	47.48	8.28
28.9	50.51	34.99	27.9	47.40	36.29	27.9	34.01	59.61	28.1	12.34	51.21	28.2	46.94	8.07
29.9	51.48	34.74	28.9	47.50	35.95	28.9	34.07	59.24	29.1	12.15	50.83	29.2	46.44	7.86
30.9	52.40	34.50	29.9	47.59	35.63	29.9	34.14	58.88	30.1	11.98	50.47	30.2	45.96	7.65
31.9	53.25	34.25	30.9	47.67	35.33	30.9	34.20	58.54	31.1	11.82	50.12	31.2	45.49	7.46
32.9	54.03	34.00	31.9	47.75	35.02	31.9	34.25	58.22	32.1	11.62	49.78	32.2	45.04	7.30
51.82 +51.81 8 ^h 11 ^m 46 ^s .151 +88° 53' 44''.41			6.94 +6.86 9 ^h 24 ^m 46 ^s .516 +81° 42' 44''.16			8.21 +8.15 10 ^h 20 ^m 34 ^s .492 +83° 0' 6''.83			31.52 +31.51 12 ^h 14 ^m 26 ^s .979 +88° 10' 55''.87			23.58 +23.56 15 ^h 4 ^m 59 ^s .30 +87° 34' 6''.01		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			80 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2288. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Sept.	8 11	+88 53	Sept.	9 24	+81 42	Sept.	10 20	+82 59	Sept.	12 14	+88 10	Sept.	15 4	+87 33
	s	"		s	"		s	"		s	"		s	"
1.9	54.03	34.00	1.9	47.83	34.72	1.9	34.28	57.89	1.1	11.62	49.78	1.2	45.04	67.30
2.9	54.78	33.72	2.9	47.89	34.40	2.9	34.32	57.54	2.1	11.38	49.46	2.2	44.57	67.13
3.9	55.53	33.43	3.9	47.95	34.05	3.9	34.34	57.18	3.1	11.10	49.13	3.2	44.05	66.98
4.9	56.34	33.11	4.9	48.01	33.68	4.9	34.36	56.80	4.1	10.78	48.79	4.2	43.51	66.84
5.9	57.23	32.78	5.9	48.08	33.30	5.9	34.39	56.39	5.1	10.45	48.42	5.2	42.94	66.67
6.9	58.21	32.46	6.9	48.17	32.91	6.9	34.43	55.97	6.1	10.12	48.03	6.2	42.36	66.50
7.9	59.26	32.15	7.9	48.26	32.54	7.9	34.49	55.56	7.0	9.83	47.64	7.2	41.77	66.29
8.9	60.38	31.86	8.9	48.37	32.18	8.9	34.56	55.16	8.0	9.60	47.22	8.2	41.21	66.06
9.9	61.51	31.60	9.9	48.48	31.83	9.9	34.64	54.77	9.0	9.42	46.81	9.2	40.68	65.82
10.9	62.63	31.36	10.9	48.60	31.52	10.9	34.72	54.39	10.0	9.29	46.40	10.2	40.18	65.56
11.9	63.73	31.15	11.9	48.71	31.22	11.9	34.81	54.05	11.0	9.22	46.00	11.2	39.72	65.30
12.9	64.78	30.94	12.9	48.82	30.93	12.9	34.90	53.72	12.0	9.16	45.62	12.2	39.28	65.05
13.9	65.79	30.74	13.9	48.92	30.65	13.9	34.98	53.40	13.0	9.10	45.27	13.1	38.86	64.80
14.9	66.76	30.54	14.9	49.02	30.37	14.9	35.05	53.08	14.0	9.03	44.91	14.1	38.45	64.58
15.9	67.70	30.32	15.9	49.12	30.09	15.9	35.12	52.75	15.0	8.93	44.57	15.1	38.03	64.36
16.9	68.62	30.09	16.9	49.21	29.79	16.9	35.18	52.42	16.0	8.81	44.23	16.1	37.61	64.15
17.9	69.56	29.84	17.9	49.30	29.47	17.9	35.24	52.07	17.0	8.67	43.88	17.1	37.16	63.94
18.8	70.51	29.58	18.9	49.39	29.15	18.9	35.30	51.72	18.0	8.51	43.53	18.1	36.69	63.74
19.8	71.52	29.31	19.9	49.48	28.81	19.9	35.37	51.34	19.0	8.32	43.16	19.1	36.20	63.53
20.8	72.61	29.04	20.9	49.59	28.46	20.9	35.45	50.94	20.0	8.15	42.77	20.1	35.70	63.30
21.8	73.78	28.79	21.9	49.71	28.11	21.9	35.54	50.54	21.0	7.99	42.35	21.1	35.18	63.05
22.8	75.03	28.54	22.9	49.84	27.77	22.9	35.64	50.14	22.0	7.88	41.93	22.1	34.66	62.77
23.8	76.34	28.32	23.9	49.98	27.45	23.9	35.76	49.75	23.0	7.82	41.50	23.1	34.16	62.46
24.8	77.65	28.12	24.9	50.13	27.15	24.9	35.89	49.39	24.0	7.82	41.06	24.1	33.71	62.14
25.8	78.95	27.94	25.9	50.27	26.87	25.9	36.02	49.04	24.9	7.87	40.64	25.1	33.29	61.81
26.8	80.21	27.79	26.9	50.42	26.61	26.9	36.14	48.72	25.9	7.96	40.22	26.1	32.91	61.49
27.8	81.41	27.63	27.9	50.55	26.36	27.9	36.26	48.42	26.9	8.06	39.83	27.1	32.57	61.17
28.8	82.52	27.48	28.9	50.68	26.11	28.9	36.37	48.11	27.9	8.15	39.47	28.1	32.24	60.88
29.8	83.58	27.31	29.9	50.80	25.84	29.9	36.47	47.80	28.9	8.20	39.12	29.1	31.88	60.61
30.8	84.63	27.12	30.9	50.90	25.56	30.9	36.56	47.47	29.9	8.18	38.77	30.1	31.50	60.36
31.8	85.70	26.91	31.9	51.02	25.27	31.9	36.65	47.13	30.9	8.15	38.40	31.1	31.08	60.10
32.8	86.84	26.68	32.9	51.15	24.96	32.9	36.75	46.77	31.9	8.09	38.02	32.1	30.65	59.84
51.70 +51.69			6.93 +6.86			8.20 +8.14			31.47 +31.45			23.56 +23.54		
8 ^h 11 ^m 46 ^s .151			9 ^h 24 ^m 46 ^s .516			10 ^h 20 ^m 34 ^s .492			12 ^h 14 ^m 26 ^s .979			15 ^h 4 ^m 59 ^s .30		
+88° 53' 44".41			+81° 42' 44".16			+83° 0' 6".83			+88° 10' 55".87			+87° 34' 6".01		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge Mag. 7.	
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.
	h m s	° '		h m s	° '		h m s	° '		h m s	° '		h m s
Oct.	8 12	+88 53	Oct.	9 24	+81 42	Oct.	10 20	+82 59	Oct.	12 14	+88 10	Oct.	15 4
1.8	25.70	26.91	1.9	51.02	25.27	1.9	36.65	47.13	1.9	8.09	38.02	1.1	31.08
2.8	26.84	26.68	2.9	51.15	24.96	2.9	36.75	46.77	2.9	8.02	37.63	2.1	30.65
3.8	28.05	26.46	3.9	51.27	24.63	3.9	36.85	46.39	3.9	7.99	37.21	3.1	30.19
4.8	29.35	26.25	4.9	51.41	24.31	4.9	36.97	46.01	4.9	8.01	36.78	4.1	29.72
5.8	30.71	26.06	5.9	51.56	24.00	5.9	37.11	45.64	5.9	8.08	36.34	5.1	29.28
6.8	32.10	25.90	6.8	51.72	23.72	6.9	37.25	45.28	6.9	8.22	35.91	6.1	28.88
7.8	33.49	25.76	7.8	51.88	23.46	7.9	37.41	44.95	7.9	8.39	35.49	7.1	28.51
8.8	34.86	25.64	8.8	52.05	23.22	8.9	37.56	44.65	8.9	8.59	35.10	8.1	28.19
9.8	36.17	25.53	9.8	52.20	23.00	9.9	37.71	44.35	9.9	8.81	34.72	9.1	27.88
10.8	37.43	25.44	10.8	52.35	22.79	10.9	37.86	44.07	10.9	9.02	34.34	10.1	27.60
11.8	38.64	25.34	11.8	52.50	22.59	11.9	38.00	43.81	11.9	9.23	33.99	11.1	27.34
12.8	39.81	25.24	12.8	52.64	22.39	12.9	38.14	43.54	12.9	9.39	33.65	12.1	27.08
13.8	40.96	25.12	13.8	52.78	22.17	13.9	38.26	43.27	13.9	9.53	33.30	13.1	26.81
14.8	42.10	25.00	14.8	52.92	21.94	14.9	38.38	42.99	14.9	9.65	32.94	14.1	26.53
15.8	43.25	24.86	15.8	53.05	21.71	15.9	38.51	42.70	15.9	9.76	32.59	15.1	26.22
16.8	44.44	24.71	16.8	53.19	21.46	16.9	38.64	42.39	16.9	9.86	32.22	16.1	25.89
17.8	45.69	24.56	17.8	53.34	21.20	17.9	38.77	42.07	17.9	9.98	31.83	17.1	25.55
18.8	47.01	24.42	18.8	53.50	20.94	18.9	38.91	41.74	18.9	10.14	31.42	18.1	25.20
19.8	48.41	24.28	19.8	53.67	20.68	19.9	39.07	41.41	19.9	10.34	31.00	19.1	24.85
20.8	49.86	24.18	20.8	53.84	20.44	20.9	39.24	41.09	20.9	10.59	30.57	20.1	24.52
21.8	51.34	24.10	21.8	54.02	20.22	21.9	39.43	40.79	21.9	10.90	30.16	21.1	24.23
22.8	52.80	24.04	22.8	54.21	20.04	22.9	39.62	40.52	22.9	11.26	29.77	22.1	23.99
23.8	54.22	24.02	23.8	54.39	19.87	23.9	39.80	40.26	23.9	11.64	29.40	23.1	23.77
24.7	55.58	24.00	24.8	54.56	19.71	24.9	39.98	40.03	24.9	12.02	29.05	24.1	23.59
25.7	56.86	23.98	25.8	54.73	19.57	25.9	40.16	39.82	25.9	12.36	28.72	25.1	23.44
26.7	58.06	23.93	26.8	54.88	19.42	26.9	40.32	39.59	26.9	12.65	28.41	26.1	23.31
27.7	59.23	23.87	27.8	55.03	19.24	27.9	40.47	39.36	27.9	12.91	28.09	27.1	23.12
28.7	60.42	23.79	28.8	55.18	19.06	28.9	40.61	39.11	28.9	13.13	27.75	28.1	22.92
29.7	61.65	23.72	29.8	55.33	18.86	29.9	40.76	38.84	29.9	13.35	27.39	29.1	22.68
30.7	62.94	23.62	30.8	55.49	18.64	30.9	40.92	38.55	30.9	13.58	27.03	30.1	22.42
31.7	64.30	23.53	31.8	55.66	18.43	31.9	41.09	38.26	31.9	13.84	26.64	31.1	22.16
32.7	65.73	23.46	32.8	55.84	18.24	32.9	41.27	37.98	32.9	14.18	26.24	32.1	21.91
51.63 +51.62 8 ^h 11 ^m 46 ^s .151 +88° 53' 44".41			6.93 +6.86 9 ^h 24 ^m 46 ^s .516 +81° 42' 44".16			8.20 +8.14 10 ^h 20 ^m 34 ^s .492 +83° 0' 6".83			31.41 +31.40 12 ^h 14 ^m 26 ^s .979 +88° 10' 55".87			23.54 +23.53 15 ^h 4 ^m 5 +87° 34' 6	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombridge 2283. Mag. 7.2		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Nov.	8 13	+88 53	Nov.	9 24	+81 42	Nov.	10 20	+82 59	Nov.	12 14	+88 10	Nov.	15 4	+87 33
	s	"		s	"		s	"		s	"		s	"
1.7	5.73	23.46	1.8	55.84	18.24	1.8	41.27	37.98	1.9	14.18	26.24	1.0	21.91	49.62
2.7	7.19	23.43	2.8	56.03	18.06	2.8	41.47	37.71	2.9	14.55	25.86	2.0	21.68	49.22
3.7	8.66	23.42	3.8	56.22	17.91	3.8	41.67	37.47	3.9	14.98	25.49	3.0	21.51	48.81
4.7	10.11	23.42	4.8	56.42	17.78	4.8	41.88	37.25	4.9	15.46	25.13	4.0	21.35	48.39
5.7	11.50	23.45	5.8	56.61	17.67	5.8	42.08	37.05	5.9	15.96	24.79	5.0	21.25	47.99
6.7	12.84	23.49	6.8	56.79	17.58	6.8	42.27	36.88	6.9	16.44	24.48	6.0	21.17	47.58
7.7	14.11	23.53	7.8	56.97	17.50	7.8	42.46	36.71	7.9	16.91	24.19	6.9	21.12	47.20
8.7	15.33	23.57	8.8	57.14	17.42	8.8	42.65	36.56	8.9	17.36	23.90	7.9	21.08	46.82
9.7	16.50	23.60	9.8	57.31	17.33	9.8	42.82	36.40	9.9	17.79	23.63	8.9	21.03	46.47
10.7	17.66	23.63	10.8	57.47	17.23	10.8	42.99	36.23	10.9	18.18	23.34	9.9	20.97	46.13
11.7	18.81	23.64	11.8	57.63	17.13	11.8	43.16	36.05	11.9	18.56	23.06	10.9	20.90	45.81
12.7	19.99	23.64	12.7	57.78	17.01	12.8	43.33	35.86	12.9	18.93	22.76	11.9	20.81	45.48
13.7	21.21	23.63	13.7	57.95	16.88	13.8	43.50	35.66	13.9	19.30	22.45	12.9	20.70	45.14
14.7	22.50	23.63	14.7	58.12	16.75	14.8	43.69	35.45	14.9	19.69	22.13	13.9	20.58	44.79
15.7	23.85	23.64	15.7	58.30	16.62	15.8	43.88	35.24	15.9	20.13	21.79	14.9	20.46	44.42
16.7	25.24	23.66	16.7	58.50	16.51	16.8	44.09	35.04	16.9	20.62	21.44	15.9	20.36	44.04
17.7	26.66	23.72	17.7	58.70	16.43	17.8	44.31	34.86	17.9	21.17	21.11	16.9	20.28	43.63
18.7	28.10	23.80	18.7	58.90	16.36	18.8	44.53	34.70	18.8	21.76	20.80	17.9	20.26	43.21
19.7	29.49	23.91	19.7	59.10	16.32	19.8	44.76	34.56	19.8	22.38	20.51	18.9	20.26	42.78
20.7	30.80	24.02	20.7	59.29	16.31	20.8	44.98	34.45	20.8	23.00	20.24	19.9	20.30	42.36
21.7	32.03	24.15	21.7	59.48	16.31	21.8	45.19	34.37	21.8	23.61	19.99	20.9	20.38	41.97
22.7	33.17	24.27	22.7	59.65	16.30	22.8	45.39	34.28	22.8	24.17	19.76	21.9	20.47	41.60
23.7	34.26	24.37	23.7	59.81	16.28	23.8	45.57	34.19	23.8	24.69	19.54	22.9	20.54	41.25
24.7	35.32	24.45	24.7	59.97	16.24	24.8	45.75	34.09	24.8	25.16	19.30	23.9	20.60	40.93
25.7	36.41	24.51	25.7	60.13	16.19	25.8	45.93	33.95	25.8	25.61	19.05	24.9	20.63	40.61
26.7	37.57	24.57	26.7	60.30	16.12	26.7	46.11	33.81	26.8	26.07	18.79	25.9	20.62	40.27
27.7	38.78	24.63	27.7	60.47	16.05	27.7	46.30	33.66	27.8	26.56	18.52	26.9	20.60	39.93
28.7	40.05	24.71	28.7	60.65	16.00	28.7	46.50	33.52	28.8	27.10	18.24	27.9	20.59	39.56
29.7	41.36	24.80	29.7	60.85	15.96	29.7	46.72	33.39	29.8	27.68	17.96	28.9	20.60	39.19
30.6	42.67	24.93	30.7	61.05	15.94	30.7	46.94	33.29	30.8	28.32	17.69	29.9	20.63	38.79
31.6	43.96	25.08	31.7	61.24	15.95	31.7	47.17	33.21	31.8	29.00	17.43	30.9	20.72	38.38
32.6	45.21	25.25	32.7	61.43	15.99	32.7	47.40	33.16	32.8	29.70	17.21	31.9	20.84	37.98
51.62 +51.61			6.93 +6.86			8.20 +8.14			31.36 +31.35			23.51 +23.49		
8 ^h 11 ^m 46 ^s .151			9 ^h 24 ^m 46 ^s .516			10 ^h 20 ^m 34 ^s .492			12 ^h 14 ^m 26 ^s .979			15 ^h 4 ^m 59 ^s .30		
+88° 53' 44".41			+81° 42' 44".16			+83° 0' 6".83			+88° 10' 55".87			+87° 34' 6".01		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

Groombridge 1119. Mag. 7.0			1 H. Draconis. Mag. 4.6			30 H. Camelop. Mag. 5.3			Bradley 1672. Mag. 6.3			Groombrid Mag.	
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.
Dec.	h m 8 13 s	° ' +88 53 "	Dec.	h m 9 25 s	° ' +81 42 "	Dec.	h m 10 20 s	° ' +82 59 "	Dec.	h m 12 14 s	° ' +88 10 "	Dec.	h m 15 4 s
1.6	43.96	25.08	1.7	1.24	15.95	1.7	47.17	33.21	1.8	29.00	17.43	1.9	20.84
2.6	45.21	25.25	2.7	1.43	15.99	2.7	47.40	33.16	2.8	29.70	17.21	2.9	21.00
3.6	46.39	25.44	3.7	1.62	16.05	3.7	47.62	33.11	3.8	30.40	17.01	3.9	21.19
4.6	47.50	25.63	4.7	1.79	16.11	4.7	47.84	33.09	4.8	31.09	16.83	4.9	21.39
5.6	48.53	25.82	5.7	1.96	16.18	5.7	48.04	33.09	5.8	31.76	16.67	5.9	21.60
6.6	49.51	26.00	6.7	2.12	16.25	6.7	48.23	33.08	6.8	32.40	16.51	6.9	21.80
7.6	50.46	26.17	7.7	2.28	16.31	7.7	48.42	33.07	7.8	33.01	16.36	7.9	21.98
8.6	51.39	26.34	8.7	2.43	16.36	8.7	48.61	33.05	8.8	33.59	16.20	8.9	22.15
9.6	52.32	26.48	9.7	2.58	16.40	9.7	48.79	33.03	9.8	34.15	16.04	9.9	22.29
10.6	53.28	26.62	10.7	2.73	16.44	10.7	48.96	32.99	10.8	34.70	15.87	10.9	22.42
11.6	54.30	26.75	11.7	2.89	16.46	11.7	49.15	32.94	11.8	35.26	15.69	11.9	22.54
12.6	55.37	26.91	12.7	3.06	16.49	12.7	49.34	32.89	12.8	35.87	15.50	12.9	22.68
13.6	56.48	27.06	13.7	3.24	16.53	13.7	49.55	32.85	13.8	36.51	15.29	13.9	22.84
14.6	57.62	27.24	14.7	3.42	16.58	14.7	49.77	32.82	14.8	37.21	15.10	14.9	23.04
15.6	58.76	27.45	15.7	3.60	16.67	15.7	50.00	32.81	15.8	37.95	14.91	15.9	23.27
16.6	59.87	27.69	16.7	3.78	16.78	16.7	50.23	32.83	16.8	38.73	14.76	16.9	23.54
17.6	60.91	27.95	17.7	3.96	16.91	17.7	50.45	32.87	17.8	39.52	14.63	17.9	23.85
18.6	61.84	28.21	18.6	4.13	17.06	18.7	50.67	32.94	18.8	40.29	14.52	18.9	24.19
19.6	62.69	28.47	19.6	4.29	17.21	19.7	50.87	33.02	19.8	41.03	14.45	19.9	24.52
20.6	63.47	28.71	20.6	4.43	17.36	20.7	51.05	33.10	20.8	41.71	14.38	20.9	24.83
21.6	64.20	28.94	21.6	4.57	17.48	21.7	51.22	33.16	21.8	42.34	14.31	21.9	25.12
22.6	64.92	29.14	22.6	4.70	17.59	22.7	51.39	33.21	22.8	42.93	14.23	22.9	25.38
23.6	65.67	29.33	23.6	4.83	17.69	23.7	51.55	33.24	23.8	43.52	14.13	23.9	25.60
24.6	66.48	29.51	24.6	4.97	17.77	24.7	51.72	33.26	24.8	44.11	14.01	24.9	25.82
25.6	67.34	29.71	25.6	5.12	17.86	25.7	51.91	33.28	25.7	44.75	13.89	25.9	26.06
26.6	68.24	29.92	26.6	5.28	17.96	26.7	52.11	33.30	26.7	45.44	13.77	26.9	26.32
27.6	69.16	30.16	27.6	5.45	18.08	27.7	52.31	33.35	27.7	46.17	13.66	27.9	26.62
28.6	70.07	30.42	28.6	5.61	18.24	28.7	52.52	33.43	28.7	46.93	13.56	28.9	26.96
29.6	70.94	30.71	29.6	5.77	18.42	29.7	52.73	33.53	29.7	47.74	13.50	29.9	27.34
30.6	71.73	31.01	30.6	5.92	18.62	30.7	52.93	33.65	30.7	48.53	13.46	30.9	27.76
31.6	72.43	31.32	31.6	6.07	18.84	31.7	53.12	33.79	31.7	49.31	13.45	31.8	28.19
32.6	73.05	31.64	32.6	6.21	19.06	32.7	53.31	33.95	32.7	50.06	13.44	32.8	28.61
51.67 +51.66			6.93 +6.86			8.20 +8.14			31.33 +31.31			23.48	
8 ^h 11 ^m 46 ^s .151			9 ^h 24 ^m 46 ^s .516			10 ^h 20 ^m 34 ^s .492			12 ^h 14 ^m 26 ^s .979			15 ^h 4 ^m	
+88° 53' 44".41			+81° 42' 44".16			+83° 0' 6".83			+88° 10' 55".87			+87° 34'	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			89 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Jan.	16 54	+82 10	Jan.	17 59	+86 36	Jan.	19 5	+89 0	Jan.	20 48	+82 12	Jan.	23 27	+86 49
	s	"		s	"		s	"		s	"		s	"
0.9	42.93	38.20	0.9	57.31	38.98	1.0	60.86	33.67	1.1	45.99	39.67	1.2	27.33	56.82
1.9	43.00	37.91	1.9	57.34	38.68	2.0	60.55	33.40	2.1	45.90	39.44	2.2	26.99	56.77
2.9	43.06	37.61	2.9	57.35	38.38	3.0	60.20	33.14	3.1	45.82	39.21	3.2	26.66	56.73
3.9	43.10	37.29	3.9	57.34	38.07	4.0	59.81	32.87	4.1	45.73	38.99	4.2	26.31	56.71
4.9	43.14	36.97	4.9	57.31	37.76	5.0	59.39	32.58	5.1	45.63	38.75	5.2	25.93	56.67
5.9	43.18	36.64	5.9	57.30	37.42	6.0	58.97	32.26	6.1	45.52	38.51	6.2	25.54	56.63
6.9	43.24	36.29	6.9	57.31	37.06	6.9	58.58	31.92	7.1	45.41	38.24	7.2	25.12	56.58
7.9	43.31	35.93	7.9	57.33	36.69	7.9	58.25	31.57	8.1	45.31	37.93	8.2	24.70	56.50
8.9	43.38	35.57	8.9	57.38	36.30	8.9	57.99	31.19	9.1	45.21	37.62	9.2	24.27	56.41
9.9	43.46	35.21	9.9	57.46	35.93	9.9	57.81	30.82	10.1	45.13	37.30	10.2	23.86	56.28
10.9	43.56	34.86	10.9	57.56	35.57	10.9	57.71	30.45	11.1	45.05	36.96	11.2	23.46	56.15
11.9	43.67	34.54	11.9	57.68	35.21	11.9	57.69	30.09	12.1	44.98	36.61	12.2	23.08	55.99
12.9	43.78	34.23	12.9	57.81	34.87	12.9	57.74	29.74	13.1	44.93	36.29	13.2	22.72	55.82
13.9	43.88	33.96	13.9	57.95	34.56	13.9	57.82	29.41	14.1	44.88	35.97	14.2	22.39	55.66
14.9	43.98	33.69	14.9	58.10	34.25	14.9	57.93	29.09	15.0	44.83	35.67	15.2	22.07	55.50
15.9	44.08	33.44	15.9	58.22	33.97	15.9	58.02	28.81	16.0	44.79	35.39	16.2	21.77	55.37
16.9	44.18	33.19	16.9	58.33	33.70	16.9	58.07	28.53	17.0	44.75	35.12	17.2	21.48	55.24
17.9	44.26	32.94	17.9	58.42	33.43	17.9	58.05	28.25	18.0	44.70	34.86	18.2	21.18	55.11
18.9	44.34	32.69	18.9	58.50	33.14	18.9	57.98	27.96	19.0	44.64	34.60	19.1	20.86	55.01
19.9	44.41	32.40	19.9	58.58	32.83	19.9	57.86	27.65	20.0	44.57	34.33	20.1	20.51	54.90
20.9	44.50	32.09	20.9	58.66	32.50	20.9	57.75	27.33	21.0	44.49	34.02	21.1	20.15	54.79
21.9	44.60	31.77	21.9	58.76	32.15	21.9	57.68	26.97	22.0	44.42	33.69	22.1	19.77	54.65
22.9	44.71	31.44	22.9	58.90	31.80	22.9	57.71	26.60	23.0	44.36	33.35	23.1	19.38	54.48
23.9	44.82	31.13	23.9	59.06	31.44	23.9	57.85	26.23	24.0	44.30	32.98	24.1	19.01	54.27
24.9	44.96	30.84	24.9	59.25	31.10	24.9	58.10	25.86	25.0	44.27	32.61	25.1	18.64	54.06
25.9	45.10	30.57	25.9	59.47	30.78	25.9	58.44	25.52	26.0	44.24	32.25	26.1	18.33	53.83
26.9	45.24	30.34	26.9	59.70	30.50	26.9	58.85	25.20	27.0	44.23	31.91	27.1	18.05	53.60
27.9	45.38	30.15	27.9	59.93	30.24	27.9	59.30	24.89	28.0	44.23	31.59	28.1	17.81	53.37
28.8	45.50	29.96	28.9	60.13	30.02	28.9	59.71	24.62	29.0	44.23	31.29	29.1	17.57	53.17
29.8	45.62	29.78	29.9	60.33	29.79	29.9	60.08	24.36	30.0	44.23	31.00	30.1	17.33	52.97
30.8	45.73	29.58	30.9	60.51	29.55	30.9	60.38	24.10	31.0	44.22	30.72	31.1	17.09	52.79
31.8	45.84	29.37	31.9	60.68	29.31	31.9	60.66	23.82	32.0	44.20	30.43	32.1	16.83	52.60
32.8	45.95	29.16	32.9	60.85	29.04	32.9	60.94	23 52	32.9	44.17	30.12	33.1	16.56	52.41
7.35 +7.28			16.91 +16.88			57.77 +57.76			7.38 +7.31			18.10 +18.07		
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m 45 ^s .157		
+82° 10' 55".32			+86° 36' 51".09			+89° 0' 39".69			+82° 12' 35".90			+86° 49' 39".43		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			89 H. Cep Mag. 5.	
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.
Feb.	h m 16 54	° ' +82 10	Feb.	h m 18 0	° ' +86 36	Feb.	h m 19 6	° ' +89 0	Feb.	h m 20 48	° ' +82 12	Feb.	h m 23 27
	s s	" "		s s	" "		s s	" "		s s	" "		s s
1.8	45.95	29.16	1.9	0.85	29.04	1.9	0.94	23.52	1.0	44.20	30.43	1.1	16.83
2.8	46.07	28.93	2.9	1.04	28.76	2.9	1.22	23.22	1.9	44.17	30.12	2.1	16.56
3.8	46.20	28.69	3.9	1.23	28.47	3.9	1.53	22.90	2.9	44.14	29.80	3.1	16.26
4.8	46.33	28.45	4.9	1.45	28.18	4.9	1.92	22.57	3.9	44.12	29.47	4.1	15.96
5.8	46.48	28.22	5.9	1.69	27.88	5.9	2.39	22.23	4.9	44.10	29.12	5.1	15.65
6.8	46.63	28.01	6.9	1.96	27.59	6.9	2.94	21.90	5.9	44.10	28.75	6.1	15.36
7.8	46.79	27.80	7.9	2.25	27.32	7.9	3.56	21.58	6.9	44.10	28.37	7.1	15.07
8.8	46.96	27.63	8.9	2.55	27.07	8.9	4.25	21.26	7.9	44.11	28.00	8.1	14.80
9.8	47.13	27.48	9.9	2.85	26.83	9.9	4.99	20.96	8.9	44.13	27.64	9.1	14.57
10.8	47.29	27.34	10.9	3.15	26.63	10.9	5.75	20.70	9.9	44.16	27.29	10.1	14.37
11.8	47.44	27.23	11.9	3.45	26.45	11.9	6.50	20.44	10.9	44.20	26.95	11.1	14.18
12.8	47.59	27.13	12.9	3.73	26.28	12.9	7.22	20.21	11.9	44.25	26.63	12.1	14.03
13.8	47.73	27.03	13.9	3.99	26.11	13.9	7.89	19.99	12.9	44.29	26.34	13.1	13.88
14.8	47.87	26.91	14.8	4.23	25.94	14.9	8.48	19.77	13.9	44.32	26.07	14.1	13.74
15.8	47.98	26.78	15.8	4.47	25.76	15.9	9.02	19.54	14.9	44.35	25.79	15.1	13.58
16.8	48.11	26.65	16.8	4.71	25.54	16.9	9.55	19.28	15.9	44.38	25.52	16.1	13.40
17.8	48.25	26.48	17.8	4.95	25.32	17.9	10.09	19.00	16.9	44.39	25.23	17.1	13.19
18.8	48.40	26.30	18.8	5.23	25.08	18.9	10.69	18.71	17.9	44.40	24.91	18.1	12.96
19.8	48.56	26.14	19.8	5.52	24.84	19.9	11.39	18.41	18.9	44.41	24.57	19.1	12.73
20.8	48.72	26.00	20.8	5.85	24.61	20.9	12.19	18.12	19.9	44.43	24.23	20.1	12.51
21.8	48.91	25.89	21.8	6.20	24.41	21.9	13.10	17.86	20.9	44.48	23.87	21.1	12.32
22.8	49.09	25.81	22.8	6.56	24.24	22.9	14.08	17.62	21.9	44.53	23.51	22.1	12.16
23.8	49.26	25.76	23.8	6.93	24.11	23.9	15.10	17.40	22.9	44.60	23.17	23.1	12.03
24.8	49.43	25.73	24.8	7.27	24.01	24.9	16.10	17.21	23.9	44.68	22.86	24.0	11.94
25.8	49.58	25.72	25.8	7.59	23.91	25.9	17.05	17.04	24.9	44.76	22.58	25.0	11.88
26.8	49.73	25.70	26.8	7.90	23.81	26.9	17.92	16.88	25.9	44.85	22.31	26.0	11.83
27.8	49.86	25.67	27.8	8.20	23.71	27.9	18.75	16.70	26.9	44.93	22.06	27.0	11.78
28.8	50.00	25.63	28.8	8.48	23.60	28.9	19.56	16.52	27.9	45.00	21.82	28.0	11.71
29.8	50.15	25.58	29.8	8.76	23.47	29.9	20.37	16.32	28.9	45.06	21.56	29.0	11.62
30.8	50.30	25.52	30.8	9.08	23.32	30.9	21.20	16.11	29.9	45.11	21.30	30.0	11.51
7.34 +7.28			16.90 +16.87			57.61 +57.60			7.38 +7.31			18.09 +	
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m 4	
+82° 10' 55".32			+86° 36' 51".09			+89° 0' 39".69			+82° 12' 35".90			+86° 49' 3	

MARCH, 1913.

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APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT W

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APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m ° '			h m ° '			h m ° '			h m ° '			h m ° '	
Apr.	16 54	+82 10	Apr.	18 0	+86 36	Apr.	19 6	+89 0	Apr.	20 48	+82 12	Apr.	23 27	+86 49
	s "			s "			s "			s "			s "	
1.7	54.91	27.41	1.7	19.59	22.68	1.8	54.32	12.88	1.8	48.51	14.45	1.9	12.47	35.33
2.7	55.06	27.55	2.7	19.96	22.72	2.8	55.56	12.83	2.8	48.65	14.27	2.9	12.58	35.02
3.7	55.21	27.70	3.7	20.34	22.79	3.8	56.85	12.79	3.8	48.79	14.10	3.9	12.72	34.70
4.7	55.36	27.87	4.7	20.73	22.87	4.8	58.18	12.78	4.8	48.94	13.95	4.9	12.88	34.38
5.7	55.51	28.07	5.7	21.12	22.97	5.8	59.53	12.78	5.8	49.11	13.81	5.9	13.07	34.07
6.7	55.66	28.29	6.7	21.49	23.10	6.8	60.88	12.80	6.8	49.28	13.70	6.9	13.30	33.78
7.7	55.79	28.52	7.7	21.84	23.25	7.8	62.18	12.86	7.8	49.45	13.61	7.9	13.53	33.50
8.7	55.92	28.76	8.7	22.18	23.41	8.7	63.42	12.93	8.8	49.61	13.54	8.9	13.78	33.24
9.7	56.03	28.99	9.7	22.49	23.57	9.7	64.58	13.01	9.8	49.77	13.49	9.9	14.03	33.01
10.7	56.13	29.21	10.7	22.77	23.73	10.7	65.66	13.09	10.8	49.92	13.45	10.9	14.26	32.79
11.6	56.23	29.42	11.7	23.04	23.87	11.7	66.67	13.16	11.8	50.06	13.40	11.9	14.47	32.59
12.6	56.33	29.60	12.7	23.31	24.00	12.7	67.64	13.22	12.8	50.18	13.34	12.9	14.66	32.39
13.6	56.43	29.76	13.7	23.57	24.10	13.7	68.62	13.25	13.8	50.30	13.27	13.9	14.83	32.17
14.6	56.54	29.93	14.7	23.86	24.20	14.7	69.65	13.27	14.8	50.43	13.17	14.9	15.00	31.94
15.6	56.65	30.10	15.7	24.17	24.30	15.7	70.76	13.29	15.8	50.57	13.07	15.9	15.17	31.68
16.6	56.78	30.29	16.7	24.51	24.41	16.7	71.95	13.32	16.8	50.72	12.98	16.9	15.35	31.42
17.6	56.91	30.52	17.7	24.85	24.56	17.7	73.20	13.37	17.8	50.88	12.89	17.9	15.59	31.15
18.6	57.04	30.77	18.7	25.19	24.73	18.7	74.48	13.45	18.8	51.05	12.84	18.9	15.86	30.89
19.6	57.15	31.06	19.7	25.53	24.93	19.7	75.77	13.55	19.8	51.24	12.80	19.9	16.16	30.64
20.6	57.26	31.35	20.7	25.83	25.15	20.7	76.99	13.69	20.8	51.42	12.80	20.9	16.48	30.42
21.6	57.35	31.64	21.7	26.11	25.39	21.7	78.14	13.84	21.8	51.59	12.81	21.9	16.81	30.22
22.6	57.43	31.94	22.7	26.36	25.63	22.7	79.20	14.00	22.8	51.75	12.85	22.9	17.14	30.05
23.6	57.49	32.22	23.7	26.60	25.85	23.7	80.18	14.16	23.8	51.91	12.89	23.9	17.44	29.90
24.6	57.56	32.48	24.7	26.82	26.06	24.7	81.12	14.30	24.8	52.06	12.93	24.9	17.72	29.74
25.6	57.64	32.72	25.7	27.05	26.25	25.7	82.04	14.43	25.8	52.19	12.95	25.9	17.98	29.57
26.6	57.72	32.95	26.7	27.29	26.42	26.7	82.97	14.55	26.8	52.33	12.96	26.9	18.22	29.40
27.6	57.80	33.17	27.7	27.53	26.60	27.7	83.93	14.64	27.8	52.47	12.96	27.9	18.47	29.22
28.6	57.88	33.40	28.6	27.78	26.78	28.7	84.94	14.74	28.8	52.62	12.95	28.9	18.72	29.02
29.6	57.98	33.66	29.6	28.06	26.96	29.7	86.00	14.85	29.8	52.77	12.93	29.9	18.99	28.82
30.6	58.07	33.92	30.6	28.35	27.16	30.7	87.10	14.96	30.8	52.93	12.93	30.9	19.27	28.62
31.6	58.16	34.20	31.6	28.63	27.37	31.7	88.23	15.10	31.8	53.10	12.93	31.9	19.58	28.41
7.35 +7.28			16.90 +16.87			57.51 +57.50			7.37 +7.30			18.06 +18.03		
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m 45 ^s .157		
+82° 10' 55".32			+86° 36' 51".09			+89° 0' 39".69			+82° 12' 35".90			+86° 49' 39".43		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
May	16 54	+82 10	May	18 0	+86 36	May	19 7	+89 0	May	20 48	+82 12	May	23 27	+86 49
	s	"		s	"		s	"		s	"		s	"
1.6	58.16	34.20	1.6	28.63	27.37	1.7	28.23	15.10	1.8	53.10	12.93	1.9	19.58	28.41
2.6	58.25	34.50	2.6	28.91	27.61	2.7	29.38	15.26	2.8	53.29	12.96	2.9	19.92	28.22
3.6	58.34	34.82	3.6	29.18	27.88	3.7	30.54	15.43	3.8	53.47	13.01	3.9	20.27	28.04
4.6	58.42	35.15	4.6	29.43	28.16	4.7	31.65	15.64	4.7	53.64	13.07	4.9	20.64	27.86
5.6	58.49	35.49	5.6	29.66	28.44	5.7	32.70	15.86	5.7	53.81	13.17	5.9	21.02	27.71
6.6	58.54	35.83	6.6	29.86	28.73	6.7	33.66	16.09	6.7	53.98	13.28	6.9	21.41	27.59
7.6	58.58	36.16	7.6	30.04	29.02	7.7	34.53	16.33	7.7	54.15	13.41	7.9	21.78	27.49
8.6	58.62	36.47	8.6	30.19	29.30	8.7	35.30	16.54	8.7	54.29	13.54	8.8	22.13	27.42
9.6	58.65	36.76	9.6	30.34	29.56	9.7	36.01	16.74	9.7	54.42	13.66	9.8	22.45	27.35
10.6	58.68	37.02	10.6	30.48	29.79	10.7	36.71	16.93	10.7	54.54	13.77	10.8	22.75	27.27
11.6	58.72	37.28	11.6	30.64	30.01	11.7	37.43	17.10	11.7	54.67	13.85	11.8	23.04	27.17
12.6	58.77	37.54	12.6	30.81	30.22	12.7	38.20	17.26	12.7	54.81	13.92	12.8	23.33	27.07
13.6	58.82	37.80	13.6	31.01	30.45	13.7	39.05	17.42	13.7	54.95	13.98	13.8	23.63	26.94
14.6	58.88	38.09	14.6	31.22	30.70	14.7	39.98	17.59	14.7	55.10	14.06	14.8	23.96	26.81
15.6	58.94	38.40	15.6	31.43	30.97	15.6	40.94	17.80	15.7	55.26	14.15	15.8	24.32	26.68
16.6	58.99	38.74	16.6	31.64	31.26	16.6	41.91	18.04	16.7	55.43	14.27	16.8	24.71	26.56
17.6	59.03	39.09	17.6	31.81	31.59	17.6	42.83	18.29	17.7	55.60	14.42	17.8	25.13	26.47
18.5	59.06	39.46	18.6	31.96	31.93	18.6	43.67	18.58	18.7	55.77	14.60	18.8	25.56	26.39
19.5	59.06	39.83	19.6	32.08	32.27	19.6	44.40	18.87	19.7	55.93	14.80	19.8	25.98	26.35
20.5	59.06	40.18	20.6	32.18	32.60	20.6	45.04	19.16	20.7	56.07	15.01	20.8	26.39	26.33
21.5	59.06	40.50	21.6	32.26	32.91	21.6	45.62	19.44	21.7	56.20	15.21	21.8	26.77	26.32
22.5	59.06	40.81	22.6	32.34	33.21	22.6	46.15	19.70	22.7	56.33	15.39	22.8	27.12	26.32
23.5	59.06	41.10	23.6	32.41	33.49	23.6	46.67	19.94	23.7	56.45	15.57	23.8	27.46	26.32
24.5	59.07	41.38	24.6	32.49	33.75	24.6	47.21	20.17	24.7	56.57	15.74	24.8	27.79	26.29
25.5	59.08	41.66	25.6	32.59	34.01	25.6	47.80	20.39	25.7	56.69	15.88	25.8	28.12	26.25
26.5	59.09	41.94	26.6	32.70	34.27	26.6	48.43	20.61	26.7	56.82	16.03	26.8	28.45	26.21
27.5	59.11	42.24	27.6	32.83	34.54	27.6	49.10	20.84	27.7	56.96	16.18	27.8	28.80	26.16
28.5	59.13	42.55	28.6	32.96	34.83	28.6	49.81	21.08	28.7	57.10	16.33	28.8	29.17	26.11
29.5	59.15	42.87	29.6	33.08	35.14	29.6	50.52	21.33	29.7	57.24	16.51	29.8	29.56	26.06
30.5	59.17	43.22	30.6	33.19	35.46	30.6	51.21	21.61	30.7	57.39	16.69	30.8	29.97	26.02
31.5	59.17	43.57	31.6	33.29	35.80	31.6	51.88	21.91	31.7	57.54	16.90	31.8	30.40	26.00
32.5	59.16	43.94	32.6	33.36	36.15	32.6	52.50	22.24	32.7	57.69	17.14	32.8	30.84	26.01
7.35 +7.28			16.90 +16.87			57.58 +57.57			7.37 +7.30			18.05 +18.02		
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m 45 ^s .157		
+82° 10' 55".32			+86° 36' 51".09			+89° 0' 39".69			+82° 12' 35".90			+86° 49' 39".43		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			89 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
June	h m 16 54	° ' +82 10	June	h m 18 0	° ' +86 36	June	h m 19 7	° ' +89 0	June	h m 20 48	° ' +82 12	June	h m 23 27	° ' +86 49
	s "	"		s "	"		s "	"		s "	"		s "	"
1.5	59.16	43.94	1.6	33.36	36.15	1.6	52.50	22.24	1.7	57.69	17.14	1.8	30.84	26.01
2.5	59.15	44.30	2.6	33.41	36.51	2.6	53.02	22.57	2.7	57.84	17.40	2.8	31.28	26.04
3.5	59.11	44.66	3.6	33.44	36.88	3.6	53.45	22.91	3.7	57.96	17.68	3.8	31.70	26.09
4.5	59.07	44.99	4.5	33.44	37.23	4.6	53.78	23.24	4.7	58.08	17.96	4.8	32.10	26.17
5.5	59.03	45.30	5.5	33.41	37.55	5.6	54.02	23.56	5.7	58.18	18.22	5.8	32.49	26.25
6.5	58.98	45.59	6.5	33.39	37.86	6.6	54.21	23.85	6.7	58.28	18.48	6.8	32.83	26.34
7.5	58.94	45.86	7.5	33.37	38.14	7.6	54.43	24.13	7.7	58.37	18.72	7.8	33.16	26.41
8.5	58.91	46.12	8.5	33.36	38.40	8.6	54.68	24.38	8.7	58.46	18.93	8.8	33.48	26.46
9.5	58.89	46.38	9.5	33.37	38.67	9.6	55.00	24.63	9.7	58.56	19.14	9.8	33.81	26.50
10.5	58.87	46.66	10.5	33.40	38.95	10.6	55.39	24.89	10.6	58.67	19.35	10.8	34.16	26.53
11.5	58.85	46.96	11.5	33.44	39.25	11.6	55.83	25.17	11.6	58.79	19.57	11.8	34.54	26.55
12.5	58.83	47.29	12.5	33.48	39.58	12.6	56.28	25.48	12.6	58.91	19.82	12.8	34.94	26.59
13.5	58.80	47.64	13.5	33.50	39.93	13.6	56.71	25.81	13.6	59.04	20.09	13.7	35.37	26.64
14.5	58.75	48.00	14.5	33.49	40.30	14.6	57.06	26.16	14.6	59.16	20.39	14.7	35.81	26.73
15.5	58.69	48.36	15.5	33.45	40.67	15.6	57.30	26.52	15.6	59.27	20.71	15.7	36.25	26.83
16.5	58.62	48.70	16.5	33.39	41.04	16.6	57.45	26.88	16.6	59.38	21.04	16.7	36.68	26.97
17.5	58.54	49.01	17.5	33.29	41.39	17.6	57.51	27.24	17.6	59.47	21.37	17.7	37.07	27.12
18.5	58.46	49.31	18.5	33.20	41.72	18.6	57.51	27.57	18.6	59.55	21.68	18.7	37.44	27.27
19.5	58.39	49.58	19.5	33.10	42.02	19.6	57.49	27.89	19.6	59.62	21.98	19.7	37.77	27.43
20.5	58.32	49.84	20.5	33.00	42.31	20.6	57.47	28.18	20.6	59.69	22.28	20.7	38.10	27.56
21.5	58.25	50.09	21.5	32.92	42.59	21.5	57.48	28.47	21.6	59.77	22.55	21.7	38.42	27.68
22.5	58.19	50.34	22.5	32.84	42.87	22.5	57.52	28.74	22.6	59.85	22.81	22.7	38.75	27.80
23.5	58.14	50.60	23.5	32.79	43.15	23.5	57.61	29.02	23.6	59.93	23.06	23.7	39.08	27.90
24.4	58.09	50.88	24.5	32.74	43.44	24.5	57.74	29.32	24.6	60.01	23.32	24.7	39.42	28.00
25.4	58.03	51.17	25.5	32.69	43.75	25.5	57.89	29.62	25.6	60.10	23.60	25.7	39.78	28.11
26.4	57.97	51.47	26.5	32.63	44.08	26.5	58.04	29.94	26.6	60.20	23.89	26.7	40.15	28.22
27.4	57.90	51.78	27.5	32.56	44.42	27.5	58.16	30.28	27.6	60.29	24.21	27.7	40.56	28.35
28.4	57.83	52.11	28.5	32.48	44.77	28.5	58.23	30.64	28.6	60.38	24.54	28.7	40.97	28.50
29.4	57.74	52.43	29.5	32.37	45.12	29.5	58.22	31.01	29.6	60.47	24.89	29.7	41.38	28.66
30.4	57.63	52.74	30.5	32.22	45.48	30.5	58.11	31.39	30.6	60.54	25.26	30.7	41.78	28.85
31.4	57.52	53.03	31.5	32.04	45.83	31.5	57.89	31.76	31.6	60.60	25.63	31.7	42.15	29.07
7.35 +7.28			16.92 +16.89			57.72 +57.71			7.37 +7.31			18.05 +18.02		
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m 45 ^s .157		
+82° 10' 55''.32			+86° 36' 51''.09			+89° 0' 39''.69			+82° 12' 35''.90			+86° 49' 39''.43		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
July	16 54	+82 10	July	18 0	+86 36	July	19 7	+89 0	July	20 49	+82 12	July	23 27	+86 49
	s	"		s	"		s	"		s	"		s	"
14	57.52	53.03	1.5	32.04	45.83	1.5	57.89	31.76	1.6	0.60	25.63	1.7	42.15	29.07
24	57.41	53.31	2.5	31.85	46.15	2.5	57.58	32.12	2.6	0.65	26.00	2.7	42.51	29.30
34	57.30	53.54	3.5	31.66	46.45	3.5	57.22	32.45	3.6	0.69	26.36	3.7	42.82	29.53
44	57.18	53.76	4.5	31.46	46.72	4.5	56.84	32.77	4.6	0.73	26.70	4.7	43.12	29.77
54	57.08	53.96	5.5	31.27	46.97	5.5	56.48	33.06	5.6	0.75	27.02	5.7	43.40	29.98
64	56.98	54.15	6.5	31.10	47.22	6.5	56.18	33.34	6.6	0.78	27.32	6.7	43.67	30.19
74	56.90	54.37	7.5	30.95	47.47	7.5	55.95	33.62	7.6	0.83	27.61	7.7	43.95	30.36
84	56.81	54.60	8.5	30.82	47.75	8.5	55.78	33.91	8.6	0.88	27.91	8.7	44.26	30.53
94	56.72	54.86	9.5	30.69	48.05	9.5	55.65	34.23	9.6	0.95	28.23	9.7	44.60	30.71
104	56.63	55.14	10.4	30.55	48.36	10.5	55.50	34.57	10.6	1.01	28.57	10.7	44.96	30.91
114	56.52	55.43	11.4	30.37	48.70	11.5	55.30	34.94	11.6	1.07	28.94	11.7	45.34	31.12
124	56.40	55.72	12.4	30.18	49.04	12.5	55.01	35.31	12.6	1.13	29.32	12.7	45.72	31.35
134	56.27	55.99	13.4	29.96	49.38	13.5	54.62	35.70	13.6	1.17	29.72	13.7	46.09	31.63
144	56.13	56.24	14.4	29.71	49.70	14.5	54.12	36.06	14.6	1.20	30.12	14.7	46.42	31.91
154	55.99	56.46	15.4	29.46	49.99	15.5	53.55	36.41	15.6	1.22	30.50	15.7	46.73	32.20
164	55.85	56.66	16.4	29.19	50.26	16.5	52.94	36.73	16.5	1.23	30.88	16.7	47.00	32.49
174	55.71	56.86	17.4	28.93	50.51	17.5	52.34	37.04	17.5	1.23	31.24	17.7	47.26	32.76
184	55.58	57.03	18.4	28.68	50.75	18.5	51.76	37.32	18.5	1.23	31.58	18.7	47.51	33.03
194	55.46	57.20	19.4	28.44	50.98	19.5	51.22	37.60	19.5	1.23	31.91	19.7	47.75	33.28
204	55.34	57.35	20.4	28.22	51.21	20.5	50.73	37.88	20.5	1.24	32.23	20.6	47.99	33.53
214	55.23	57.54	21.4	28.01	51.45	21.5	50.28	38.16	21.5	1.26	32.54	21.6	48.25	33.76
224	55.12	57.73	22.4	27.81	51.70	22.5	49.84	38.45	22.5	1.28	32.86	22.6	48.52	33.99
234	55.00	57.94	23.4	27.60	51.96	23.5	49.40	38.75	23.5	1.30	33.20	23.6	48.80	34.23
244	54.88	58.15	24.4	27.37	52.24	24.5	48.96	39.07	24.5	1.33	33.56	24.6	49.10	34.47
254	54.75	58.37	25.4	27.14	52.54	25.5	48.49	39.41	25.5	1.36	33.92	25.6	49.41	34.73
264	54.61	58.59	26.4	26.88	52.83	26.5	47.94	39.75	26.5	1.38	34.30	26.6	49.72	35.02
274	54.46	58.81	27.4	26.60	53.12	27.4	47.31	40.11	27.5	1.39	34.70	27.6	50.03	35.32
284	54.29	59.02	28.4	26.30	53.41	28.4	46.58	40.46	28.5	1.38	35.12	28.6	50.32	35.65
294	54.12	59.20	29.4	25.96	53.67	29.4	45.75	40.80	29.5	1.36	35.53	29.6	50.59	35.99
30.3	53.95	59.35	30.4	25.60	53.91	30.4	44.85	41.11	30.5	1.33	35.93	30.6	50.82	36.35
31.3	53.78	59.46	31.4	25.25	54.13	31.4	43.92	41.40	31.5	1.30	36.31	31.6	51.02	36.70
32.3	53.62	59.56	32.4	24.91	54.31	32.4	42.98	41.67	32.5	1.25	36.67	32.6	51.18	37.04
7.35 +7.28			16.93 +16.90			57.88 +57.88			7.38 +7.31			18.06 +18.03		
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m 45 ^s .157		
+82° 10' 55".32			+86° 36' 51".09			+89° 0' 39".69			+82° 12' 35".90			+86° 49' 39".43		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m ° '			h m ° '			h m ° '			h m ° '			h m ° '	
Aug.	16 54	+82 10	Aug.	18 0	+86 36	Aug.	19 7	+89 0	Aug.	20 48	+82 12	Aug.	23 27	+86 49
	s "			s "			s "			s "			s "	
1.3	53.62	59.56	1.4	24.91	54.31	1.4	42.98	41.67	1.5	61.25	36.67	1.6	51.18	37.04
2.3	53.47	59.66	2.4	24.59	54.49	2.4	42.08	41.92	2.5	61.21	37.00	2.6	51.34	37.35
3.3	53.32	59.76	3.4	24.29	54.67	3.4	41.27	42.17	3.5	61.18	37.32	3.6	51.52	37.64
4.3	53.19	59.87	4.4	24.00	54.85	4.4	40.54	42.42	4.5	61.16	37.64	4.6	51.71	37.93
5.3	53.05	60.00	5.4	23.73	55.06	5.4	39.85	42.68	5.5	61.14	37.98	5.6	51.92	38.22
6.3	52.91	60.15	6.4	23.44	55.29	6.4	39.17	42.98	6.5	61.13	38.33	6.6	52.16	38.51
7.3	52.76	60.33	7.4	23.15	55.54	7.4	38.44	43.30	7.5	61.13	38.70	7.6	52.42	38.82
8.3	52.59	60.50	8.4	22.83	55.80	8.4	37.65	43.62	8.5	61.12	39.09	8.6	52.69	39.14
9.3	52.42	60.65	9.4	22.48	56.05	9.4	36.77	43.96	9.5	61.09	39.50	9.6	52.93	39.50
10.3	52.24	60.80	10.4	22.12	56.29	10.4	35.79	44.28	10.5	61.05	39.91	10.6	53.16	39.88
11.3	52.05	60.92	11.4	21.74	56.51	11.4	34.72	44.59	11.5	61.00	40.31	11.6	53.35	40.26
12.3	51.86	61.01	12.4	21.34	56.70	12.4	33.61	44.87	12.5	60.95	40.70	12.6	53.52	40.64
13.3	51.68	61.09	13.4	20.95	56.87	13.4	32.50	45.13	13.5	60.88	41.06	13.6	53.66	41.02
14.3	51.51	61.14	14.4	20.56	57.02	14.4	31.39	45.37	14.5	60.81	41.41	14.6	53.77	41.38
15.3	51.34	61.18	15.4	20.20	57.16	15.4	30.32	45.59	15.5	60.74	41.74	15.6	53.88	41.73
16.3	51.18	61.22	16.3	19.85	57.30	16.4	29.32	45.81	16.5	60.68	42.06	16.6	54.00	42.07
17.3	51.03	61.27	17.3	19.51	57.44	17.4	28.35	46.03	17.5	60.62	42.37	17.6	54.12	42.39
18.3	50.88	61.35	18.3	19.18	57.59	18.4	27.42	46.26	18.5	60.56	42.68	18.6	54.26	42.71
19.3	50.74	61.43	19.3	18.85	57.74	19.4	26.51	46.49	19.5	60.52	43.00	19.6	54.40	43.03
20.3	50.58	61.51	20.3	18.52	57.92	20.4	25.60	46.74	20.5	60.48	43.33	20.6	54.56	43.35
21.3	50.42	61.60	21.3	18.18	58.10	21.4	24.66	47.01	21.5	60.43	43.68	21.6	54.73	43.69
22.3	50.25	61.71	22.3	17.83	58.29	22.4	23.67	47.29	22.4	60.38	44.05	22.5	54.91	44.05
23.3	50.07	61.80	23.3	17.45	58.48	23.4	22.62	47.57	23.4	60.32	44.42	23.6	55.08	44.42
24.3	49.88	61.88	24.3	17.05	58.67	24.4	21.47	47.84	24.4	60.26	44.81	24.6	55.25	44.82
25.3	49.68	61.94	25.3	16.62	58.84	25.4	20.23	48.11	25.4	60.18	45.19	25.6	55.39	45.23
26.3	49.48	61.96	26.3	16.18	58.98	26.4	18.90	48.36	26.4	60.09	45.57	26.5	55.49	45.64
27.3	49.28	61.97	27.3	15.72	59.10	27.4	17.53	48.59	27.4	59.99	45.93	27.5	55.56	46.07
28.3	49.08	61.96	28.3	15.28	59.20	28.4	16.15	48.78	28.4	59.88	46.26	28.5	55.60	46.48
29.3	48.90	61.93	29.3	14.85	59.27	29.4	14.81	48.95	29.4	59.76	46.58	29.5	55.63	46.87
30.3	48.73	61.89	30.3	14.45	59.33	30.4	13.53	49.11	30.4	59.66	46.87	30.5	55.64	47.24
31.3	48.57	61.85	31.3	14.05	59.40	31.4	12.33	49.27	31.4	59.56	47.15	31.5	55.67	47.59
32.3	48.41	61.84	32.3	13.69	59.48	32.4	11.19	49.45	32.4	59.48	47.44	32.5	55.72	47.93
7.35	+7.28		16.94	+16.91		58.03	+58.03		7.38	+7.31		18.07	+18.05	
16 ^h 54 ^m	50 ^s .519		18 ^h 0 ^m	19 ^s .30		19 ^h 7 ^m	25 ^s .98		20 ^h 48 ^m	57 ^s .123		23 ^h 27 ^m	45 ^s .157	
+82° 10'	55'''.32		+86° 36'	51'''.09		+89° 0'	39'''.69		+82° 12'	35'''.90		+86° 49'	39'''.43	

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '	Sept.	h m	° '
	s	"		s	"		s	"		s	"		s	"
1.3	48.41	61.84	1.3	13.69	59.48	1.4	71.19	49.45	1.4	59.48	47.44	1.5	55.72	47.93
2.3	48.25	61.85	2.3	13.32	59.59	2.3	70.09	49.66	2.4	59.41	47.75	2.5	55.80	48.28
3.3	48.08	61.89	3.3	12.95	59.72	3.3	68.98	49.87	3.4	59.33	48.07	3.5	55.91	48.63
4.3	47.90	61.93	4.3	12.55	59.85	4.3	67.82	50.10	4.4	59.25	48.42	4.5	56.02	49.01
5.2	47.71	61.96	5.3	12.12	59.99	5.3	66.57	50.35	5.4	59.17	48.78	5.5	56.12	49.41
6.2	47.52	61.98	6.3	11.69	60.12	6.3	65.23	50.59	6.4	59.07	49.15	6.5	56.21	49.83
7.2	47.32	61.97	7.3	11.22	60.23	7.3	63.81	50.82	7.4	58.95	49.52	7.5	56.27	50.26
8.2	47.12	61.93	8.3	10.75	60.31	8.3	62.33	51.02	8.4	58.83	49.86	8.5	56.30	50.70
9.2	46.91	61.88	9.3	10.29	60.37	9.3	60.85	51.18	9.4	58.70	50.18	9.5	56.29	51.12
10.2	46.71	61.80	10.3	9.83	60.41	10.3	59.37	51.34	10.4	58.57	50.48	10.5	56.26	51.53
11.2	46.54	61.71	11.3	9.39	60.43	11.3	57.93	51.47	11.4	58.44	50.77	11.5	56.22	51.92
12.2	46.37	61.62	12.3	8.97	60.45	12.3	56.54	51.59	12.4	58.32	51.03	12.5	56.17	52.30
13.2	46.20	61.53	13.3	8.56	60.46	13.3	55.23	51.71	13.4	58.20	51.27	13.5	56.13	52.65
14.2	46.04	61.46	14.3	8.17	60.48	14.3	53.95	51.82	14.4	58.08	51.52	14.5	56.10	53.00
15.2	45.88	61.39	15.3	7.79	60.51	15.3	52.70	51.95	15.4	57.97	51.77	15.5	56.09	53.35
16.2	45.72	61.33	16.3	7.41	60.55	16.3	51.47	52.10	16.4	57.87	52.03	16.5	56.09	53.70
17.2	45.56	61.29	17.3	7.02	60.60	17.3	50.23	52.26	17.4	57.77	52.32	17.5	56.11	54.06
18.2	45.38	61.25	18.3	6.62	60.67	18.3	48.96	52.42	18.4	57.66	52.61	18.5	56.13	54.43
19.2	45.20	61.21	19.3	6.20	60.74	19.3	47.63	52.59	19.4	57.55	52.91	19.5	56.14	54.82
20.2	45.01	61.17	20.3	5.76	60.80	20.3	46.23	52.76	20.4	57.43	53.22	20.5	56.15	55.24
21.2	44.82	61.09	21.2	5.29	60.85	21.3	44.72	52.93	21.4	57.30	53.53	21.5	56.14	55.66
22.2	44.62	60.98	22.2	4.81	60.87	22.3	43.15	53.08	22.4	57.16	53.84	22.5	56.10	56.09
23.2	44.41	60.86	23.2	4.32	60.86	23.3	41.53	53.19	23.4	57.00	54.14	23.5	56.02	56.53
24.2	44.22	60.71	24.2	3.84	60.84	24.3	39.89	53.29	24.4	56.84	54.40	24.5	55.91	56.96
25.2	44.03	60.54	25.2	3.37	60.78	25.3	38.27	53.35	25.4	56.67	54.64	25.5	55.77	57.36
26.2	43.87	60.37	26.2	2.94	60.72	26.3	36.72	53.40	26.4	56.51	54.85	26.5	55.64	57.74
27.2	43.71	60.19	27.2	2.51	60.66	27.3	35.25	53.45	27.4	56.36	55.05	27.5	55.51	58.10
28.2	43.55	60.04	28.2	2.11	60.60	28.3	33.86	53.50	28.3	56.23	55.25	28.5	55.40	58.45
29.2	43.39	59.90	29.2	1.72	60.57	29.3	32.52	53.57	29.3	56.10	55.45	29.5	55.31	58.79
30.2	43.23	59.78	30.2	1.32	60.55	30.3	31.19	53.66	30.3	55.98	55.68	30.5	55.25	59.14
31.2	43.07	59.68	31.2	0.92	60.56	31.3	29.83	53.77	31.3	55.85	55.93	31.4	55.20	59.50
7.35 +7.28			16.95 +16.92			58.14 +58.13			7.38 +7.31			18.09 +18.06		
16 ^h 54 ^m 50°.519			18 ^h 0 ^m 19°.30			19 ^h 7 ^m 25°.98			20 ^h 48 ^m 57°.123			23 ^h 27 ^m 45°.157		
+82° 10' 55''.32			+86° 36' 51''.09			+89° 0' 39''.69			+82° 12' 35''.90			+86° 49' 39''.43		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Oct.	16 54	+82 10	Oct.	17 59	+86 36	Oct.	19 5	+89 0	Oct.	20 48	+82 12	Oct.	23 27	+86 49
	s	"		s	"		s	"		s	"		s	"
1.2	43.07	59.68	1.2	60.92	60.56	1.3	89.83	53.77	1.3	55.85	55.93	1.4	55.20	59.50
2.2	42.89	59.58	2.2	60.48	60.56	2.3	88.41	53.89	2.3	55.71	56.20	2.4	55.15	59.89
3.2	42.71	59.47	3.2	60.02	60.56	3.3	86.90	54.01	3.3	55.57	56.47	3.4	55.09	60.30
4.2	42.52	59.34	4.2	59.55	60.54	4.3	85.31	54.11	4.3	55.42	56.74	4.4	55.00	60.73
5.2	42.33	59.18	5.2	59.07	60.49	5.3	83.67	54.21	5.3	55.25	56.99	5.4	54.88	61.14
6.2	42.14	59.00	6.2	58.59	60.42	6.3	82.01	54.26	6.3	55.08	57.23	6.4	54.73	61.55
7.2	41.96	58.80	7.2	58.12	60.33	7.3	80.35	54.29	7.3	54.90	57.44	7.4	54.55	61.94
8.2	41.79	58.58	8.2	57.68	60.22	8.2	78.73	54.29	8.3	54.72	57.62	8.4	54.35	62.32
9.2	41.64	58.35	9.2	57.24	60.10	9.2	77.17	54.28	9.3	54.55	57.77	9.4	54.15	62.68
10.2	41.49	58.12	10.2	56.84	59.98	10.2	75.68	54.26	10.3	54.38	57.92	10.4	53.96	63.02
11.1	41.35	57.91	11.2	56.45	59.85	11.2	74.26	54.26	11.3	54.22	58.07	11.4	53.77	63.34
12.1	41.21	57.71	12.2	56.07	59.75	12.2	72.88	54.24	12.3	54.07	58.21	12.4	53.60	63.66
13.1	41.07	57.51	13.2	55.70	59.65	13.2	71.53	54.26	13.3	53.93	58.35	13.4	53.43	63.98
14.1	40.93	57.33	14.2	55.33	59.56	14.2	70.19	54.28	14.3	53.79	58.51	14.4	53.28	64.31
15.1	40.78	57.15	15.2	54.95	59.48	15.2	68.83	54.30	15.3	53.65	58.68	15.4	53.14	64.64
16.1	40.63	56.98	16.2	54.55	59.41	16.2	67.43	54.34	16.3	53.50	58.86	16.4	53.01	64.99
17.1	40.48	56.80	17.2	54.15	59.33	17.2	65.97	54.37	17.3	53.35	59.06	17.4	52.88	65.34
18.1	40.31	56.61	18.2	53.71	59.25	18.2	64.44	54.40	18.3	53.19	59.25	18.4	52.72	65.72
19.1	40.14	56.39	19.2	53.27	59.15	19.2	62.84	54.42	19.3	53.01	59.44	19.4	52.52	66.10
20.1	39.97	56.16	20.2	52.81	59.03	20.2	61.18	54.41	20.3	52.82	59.62	20.4	52.30	66.48
21.1	39.80	55.90	21.2	52.35	58.87	21.2	59.50	54.38	21.3	52.63	59.77	21.4	52.06	66.86
22.1	39.65	55.61	22.2	51.91	58.69	22.2	57.85	54.33	22.3	52.43	59.89	22.4	51.80	67.22
23.1	39.51	55.31	23.2	51.49	58.49	23.2	56.24	54.25	23.3	52.24	59.99	23.4	51.52	67.55
24.1	39.38	55.01	24.2	51.10	58.29	24.2	54.72	54.16	24.3	52.06	60.07	24.4	51.23	67.86
25.1	39.26	54.72	25.2	50.73	58.10	25.2	53.30	54.07	25.3	51.89	60.14	25.4	50.96	68.15
26.1	39.14	54.47	26.2	50.39	57.92	26.2	51.95	53.99	26.3	51.73	60.20	26.4	50.71	68.43
27.1	39.04	54.23	27.2	50.05	57.77	27.2	50.64	53.94	27.3	51.58	60.29	27.4	50.49	68.71
28.1	38.91	54.00	28.1	49.69	57.63	28.2	49.32	53.90	28.3	51.43	60.40	28.4	50.29	69.01
29.1	38.78	53.78	29.1	49.33	57.50	29.2	47.97	53.87	29.3	51.28	60.51	29.4	50.09	69.31
30.1	38.64	53.56	30.1	48.94	57.37	30.2	46.53	53.86	30.3	51.12	60.65	30.4	49.90	69.65
31.1	38.49	53.31	31.1	48.53	57.24	31.2	45.01	53.84	31.3	50.94	60.80	31.4	49.68	70.00
32.1	38.35	53.05	32.1	48.11	57.09	32.2	43.42	53.80	32.3	50.75	60.92	32.4	49.42	70.34
7.35 +7.28			16.94 +16.91			58.18 +58.17			7.38 +7.32			18.11 +18.08		
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m 45 ^s .157		
+82° 10' 55".32			+86° 36' 51".09			+89° 0' 39".69			+82° 12' 35".90			+86° 49' 39".43		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			39 H. Cephei. Mag. 5.6		
Mean Solar Date.	Right Ascension.	Declina- tion North.	Mean Solar Date.	Right Ascension.	Declina- tion North.	Mean Solar Date.	Right Ascension.	Declina- tion North.	Mean Solar Date.	Right Ascension.	Declina- tion North.	Mean Solar Date.	Right Ascension.	Declina- tion North.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Nov.	16 54	+82 10	Nov.	17 59	+86 36	Nov.	19 5	+89 0	Nov.	20 48	+82 13	Nov.	23 27	+86 50
	s	"		s	"		s	"		s	"		s	"
1.1	38.35	53.05	1.1	48.11	57.09	1.2	43.42	53.80	1.3	50.75	0.92	1.4	49.42	10.34
2.1	38.20	52.75	2.1	47.69	56.89	2.2	41.81	53.73	2.3	50.55	1.03	2.4	49.13	10.68
3.1	38.06	52.44	3.1	47.28	56.68	3.2	40.21	53.63	3.2	50.36	1.10	3.4	48.81	11.01
4.1	37.94	52.10	4.1	46.89	56.45	4.2	38.66	53.50	4.2	50.16	1.15	4.4	48.48	11.31
5.1	37.82	51.76	5.1	46.52	56.20	5.2	37.17	53.37	5.2	49.97	1.19	5.4	48.15	11.60
6.1	37.72	51.43	6.1	46.19	55.94	6.2	35.76	53.21	6.2	49.79	1.19	6.4	47.82	11.86
7.1	37.63	51.11	7.1	45.87	55.69	7.2	34.42	53.04	7.2	49.61	1.19	7.3	47.48	12.11
8.1	37.54	50.80	8.1	45.56	55.44	8.2	33.14	52.88	8.2	49.44	1.19	8.3	47.17	12.34
9.1	37.45	50.49	9.1	45.27	55.22	9.2	31.91	52.75	9.2	49.28	1.18	9.3	46.87	12.57
10.1	37.36	50.20	10.1	44.98	55.01	10.2	30.72	52.63	10.2	49.14	1.19	10.3	46.59	12.80
11.1	37.28	49.92	11.1	44.69	54.80	11.2	29.53	52.52	11.2	48.98	1.21	11.3	46.32	13.02
12.1	37.19	49.65	12.1	44.39	54.60	12.2	28.31	52.41	12.2	48.82	1.24	12.3	46.05	13.27
13.1	37.09	49.38	13.1	44.07	54.40	13.2	27.04	52.29	13.2	48.66	1.29	13.3	45.78	13.52
14.1	36.99	49.09	14.1	43.74	54.21	14.1	25.72	52.18	14.2	48.49	1.33	14.3	45.51	13.79
15.1	36.88	48.80	15.1	43.40	54.00	15.1	24.33	52.08	15.2	48.32	1.37	15.3	45.21	14.07
16.1	36.77	48.48	16.1	43.04	53.76	16.1	22.89	51.96	16.2	48.12	1.40	16.3	44.88	14.34
17.0	36.67	48.13	17.1	42.70	53.49	17.1	21.42	51.79	17.2	47.93	1.41	17.3	44.52	14.61
18.0	36.57	47.75	18.1	42.36	53.21	18.1	19.97	51.59	18.2	47.74	1.39	18.3	44.13	14.86
19.0	36.49	47.37	19.1	42.05	52.90	19.1	18.58	51.39	19.2	47.55	1.33	19.3	43.73	15.09
20.0	36.41	46.99	20.1	41.76	52.58	20.1	17.28	51.16	20.2	47.37	1.27	20.3	43.33	15.30
21.0	36.35	46.61	21.1	41.51	52.26	21.1	16.07	50.93	21.2	47.20	1.18	21.3	42.94	15.48
22.0	36.30	46.26	22.1	41.27	51.95	22.1	14.96	50.70	22.2	47.04	1.09	22.3	42.56	15.65
23.0	36.25	45.93	23.1	41.05	51.67	23.1	13.93	50.50	23.2	46.90	1.01	23.3	42.21	15.81
24.0	36.20	45.62	24.1	40.84	51.42	24.1	12.91	50.31	24.2	46.75	0.95	24.3	41.89	15.96
25.0	36.14	45.32	25.1	40.61	51.18	25.1	11.85	50.14	25.2	46.60	0.90	25.3	41.59	16.14
26.0	36.08	45.02	26.1	40.36	50.96	26.1	10.75	49.99	26.2	46.45	0.87	26.3	41.29	16.34
27.0	36.01	44.71	27.1	40.08	50.72	27.1	9.57	49.83	27.2	46.28	0.85	27.3	40.97	16.54
28.0	35.94	44.38	28.1	39.79	50.46	28.1	8.34	49.67	28.2	46.11	0.82	28.3	40.63	16.76
29.0	35.87	44.03	29.1	39.51	50.17	29.1	7.07	49.48	29.2	45.94	0.78	29.3	40.26	16.97
30.0	35.80	43.65	30.1	39.23	49.86	30.1	5.80	49.25	30.2	45.75	0.71	30.3	39.87	17.17
31.0	35.73	43.26	31.1	38.98	49.53	31.1	4.57	49.01	31.2	45.57	0.62	31.3	39.46	17.36
7.35 +7.28 16 ^h 54 ^m 50 ^s .519 +82° 10' 55".32			16.94 +16.91 18 ^h 0 ^m 19 ^s .30 +86° 36' 51".09			58.14 +58.13 19 ^h 7 ^m 25 ^s .98 +89° 0' 39".69			7.38 +7.32 20 ^h 48 ^m 57 ^s .123 +82° 12' 35".90			18.13 +18.10 23 ^h 27 ^m 45 ^s .157 +86° 49' 39".43		

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Ursæ Minoris. Mag. 4.4			δ Ursæ Minoris. Mag. 4.4			λ Ursæ Minoris. Mag. 6.6			76 Draconis. Mag. 5.7			89 H. Ce Mag. 5	
Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.	Declina- tion North.	Mean Solar Date.	Right Ascen- sion.
	h m	° '		h m	° '		h m	° '		h m	° '		h m
Dec.	16 54	+82 10	Dec.	17 59	+86 36	Dec.	19 4	+89 0	Dec.	20 48	+82 12	Dec.	23 27
	s	"		s	"		s	"		s	"		s
1.0	35.73	43.26	1.1	38.98	49.53	1.1	64.57	49.01	1.2	45.57	60.62	1.3	39.46
2.0	35.69	42.86	2.1	38.74	49.19	2.1	63.42	48.75	2.2	45.40	60.50	2.3	39.02
3.0	35.66	42.45	3.0	38.53	48.84	3.1	62.35	48.47	3.2	45.23	60.36	3.3	38.59
4.0	35.64	42.06	4.0	38.36	48.48	4.1	61.35	48.18	4.2	45.07	60.20	4.3	38.17
5.0	35.63	41.68	5.0	38.19	48.14	5.1	60.43	47.91	5.2	44.92	60.03	5.3	37.76
5.9	35.62	41.32	6.0	38.05	47.82	6.1	59.59	47.64	6.2	44.79	59.87	6.3	37.38
6.9	35.62	40.98	7.0	37.92	47.51	7.1	58.79	47.38	7.2	44.66	59.72	7.3	37.01
7.9	35.61	40.64	8.0	37.80	47.21	8.1	58.00	47.13	8.2	44.53	59.58	8.3	36.66
8.9	35.60	40.32	9.0	37.66	46.92	9.1	57.21	46.90	9.2	44.40	59.44	9.3	36.31
9.9	35.58	40.00	10.0	37.50	46.65	10.1	56.40	46.67	10.1	44.26	59.32	10.3	35.98
10.9	35.56	39.68	11.0	37.33	46.38	11.1	55.54	46.46	11.1	44.11	59.20	11.3	35.63
11.9	35.53	39.35	12.0	37.16	46.08	12.1	54.64	46.24	12.1	43.96	59.08	12.3	35.27
12.9	35.50	39.00	13.0	36.97	45.77	13.1	53.69	46.00	13.1	43.80	58.97	13.2	34.89
13.9	35.47	38.63	14.0	36.78	45.44	14.1	52.70	45.73	14.1	43.64	58.83	14.2	34.48
14.9	35.44	38.24	15.0	36.60	45.09	15.1	51.71	45.44	15.1	43.48	58.66	15.2	34.05
15.9	35.44	37.83	16.0	36.45	44.71	16.1	50.77	45.13	16.1	43.31	58.47	16.2	33.60
16.9	35.45	37.42	17.0	36.32	44.33	17.1	49.92	44.79	17.1	43.17	58.25	17.2	33.14
17.9	35.47	37.01	18.0	36.23	43.95	18.1	49.17	44.45	18.1	43.03	58.02	18.2	32.68
18.9	35.50	36.62	19.0	36.17	43.58	19.1	48.53	44.11	19.1	42.90	57.78	19.2	32.25
19.9	35.54	36.25	20.0	36.13	43.24	20.0	47.99	43.80	20.1	42.79	57.54	20.2	31.85
20.9	35.57	35.92	21.0	36.09	42.91	21.0	47.51	43.52	21.1	42.69	57.32	21.2	31.48
21.9	35.60	35.59	21.9	36.04	42.59	22.0	47.02	43.24	22.1	42.59	57.12	22.2	31.13
22.9	35.62	35.29	22.9	35.99	42.31	23.0	46.50	42.99	23.1	42.48	56.94	23.2	30.80
23.9	35.63	34.98	23.9	35.92	42.02	24.0	45.91	42.75	24.1	42.36	56.77	24.2	30.46
24.9	35.64	34.66	24.9	35.83	41.73	25.0	45.26	42.49	25.1	42.24	56.60	25.2	30.11
25.9	35.65	34.33	25.9	35.72	41.41	26.0	44.57	42.21	26.1	42.11	56.42	26.2	29.72
26.9	35.67	33.96	26.9	35.63	41.07	27.0	43.86	41.90	27.1	41.97	56.22	27.2	29.32
27.9	35.69	33.59	27.9	35.55	40.71	28.0	43.19	41.58	28.1	41.83	55.99	28.2	28.89
28.9	35.73	33.19	28.9	35.49	40.33	29.0	42.58	41.24	29.1	41.71	55.73	29.2	28.44
29.9	35.77	32.79	29.9	35.47	39.94	30.0	42.06	40.88	30.1	41.59	55.46	30.2	28.00
30.9	35.83	32.42	30.9	35.47	39.55	31.0	41.63	40.52	31.1	41.48	55.16	31.2	27.57
31.9	35.90	32.05	31.9	35.50	39.18	32.0	41.30	40.17	32.1	41.38	54.87	32.2	27.14
7.35 +7.28			16.92 +16.89			58.03 +58.02			7.38 +7.32			18.13	
16 ^h 54 ^m 50 ^s .519			18 ^h 0 ^m 19 ^s .30			19 ^h 7 ^m 25 ^s .98			20 ^h 48 ^m 57 ^s .123			23 ^h 27 ^m	
+82° 10' 55''.32			+86° 36' 51''.09			+89° 0' 39''.69			+82° 12' 35''.90			+86° 49'	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	88 Piscium. Mag. 4.7		α Andromedæ. Mag. 2.2		β Cassiopeiæ. Mag. 2.4		ϵ Phœnicis. Mag. 3.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 0 0 s	° ' " — 6 11 "	h m 0 3 s	° ' " + 28 36 "	h m 0 4 s	° ' " + 58 40 "	h m 0 4 s	° ' " — 46 13 "
Jan. 0.2	52.71	43.6	52.62	44.3	30.29	27.8	60.10	55.2
10.2	52.61 ¹⁰	44.1 ⁵	52.49 ¹³	43.4 ⁹	29.97 ³²	27.1 ⁷	59.91 ¹⁹	54.8 ⁴
20.2	52.52 ⁹	44.5 ⁴	52.36 ¹³	42.3 ¹¹	29.68 ²⁹	25.9 ¹²	59.74 ¹⁷	53.9 ⁹
30.1	52.45 ⁷	44.7 ²	52.25 ¹¹	41.0 ¹³	29.42 ²⁶	24.2 ¹⁷	59.59 ¹⁵	52.6 ¹³
Feb. 9.1	52.39 ⁶	44.8 ¹	52.16 ⁹	39.5 ¹⁵	29.19 ²³	22.2 ²⁰	59.47 ¹²	50.8 ¹⁸
	4	0	7	16	18	24	9	21
19.1	52.35	44.8	52.09	37.9	29.01	19.8	59.38	48.7
Mar. 1.1	52.33 ²	44.5 ³	52.06 ³	36.4 ¹⁵	28.89 ¹²	17.2 ²⁶	59.33 ⁵	46.3 ²⁴
11.0	52.35 ²	44.0 ⁵	52.06 ⁰	34.9 ¹⁵	28.84 ⁵	14.5 ²⁷	59.32 ¹	43.6 ²⁷
21.0	52.40 ⁵	43.3 ⁷	52.10 ⁴	33.5 ¹⁴	28.86 ²	11.9 ²⁶	59.36 ⁴	40.7 ²⁹
31.0	52.48 ⁸	42.3 ¹⁰	52.19 ⁹	32.4 ¹¹	28.96 ¹⁰	9.4 ²⁵	59.44 ⁸	37.6 ³¹
	12	12	13	8	19	22	14	31
Apr. 10.0	52.60	41.1	52.32	31.6	29.15	7.2	59.58	34.5
19.9	52.77 ¹⁷	39.7 ¹⁴	52.50 ¹⁸	31.1 ⁵	29.41 ²⁶	5.3 ¹⁹	59.77 ¹⁹	31.3 ³²
29.9	52.98 ²¹	38.1 ¹⁶	52.73 ²³	30.9 ²	29.74 ³³	3.8 ¹⁵	60.01 ²⁴	28.2 ³¹
May 9.9	53.22 ²⁴	36.3 ¹⁸	52.99 ²⁶	31.1 ²	30.13 ³⁹	2.7 ¹¹	60.30 ²⁹	25.1 ³¹
19.8	53.49 ²⁷	34.3 ²⁰	53.29 ³⁰	31.8 ⁷	30.58 ⁴⁵	2.2 ⁵	60.63 ³³	22.2 ²⁹
	29	21	33	10	48	0	36	27
29.8	53.78	32.2	53.62	32.8	31.06	2.2	60.99	19.5
June 8.8	54.09 ³¹	30.1 ²¹	53.96 ³⁴	34.2 ¹⁴	31.57 ⁵¹	2.7 ⁵	61.38 ³⁹	17.1 ²⁴
18.8	54.41 ³²	27.9 ²²	54.31 ³⁵	35.9 ¹⁷	32.09 ⁵²	3.7 ¹⁰	61.79 ⁴¹	15.1 ²⁰
28.7	54.74 ³³	25.8 ²¹	54.66 ³⁵	37.8 ¹⁹	32.61 ⁵²	5.2 ¹⁵	62.21 ⁴²	13.4 ¹⁷
July 8.7	55.06 ³²	23.8 ²⁰	55.01 ³⁵	40.0 ²²	33.11 ⁵⁰	7.2 ²⁰	62.63 ⁴²	12.2 ¹²
	31	18	33	24	48	24	40	7
18.7	55.37	22.0	55.34	42.4	33.59	9.6	63.03	11.5
28.7	55.65 ²⁸	20.4 ¹⁶	55.65 ³¹	44.9 ²⁵	34.03 ⁴⁴	12.3 ²⁷	63.40 ³⁷	11.2 ³
Aug. 7.6	55.91 ²⁶	19.0 ¹⁴	55.92 ²⁷	47.5 ²⁶	34.42 ³⁹	15.3 ³⁰	63.74 ³⁴	11.4 ²
17.6	56.13 ²²	17.8 ¹²	56.16 ²⁴	50.1 ²⁶	34.75 ³³	18.5 ³²	64.04 ³⁰	12.1 ⁷
27.6	56.32 ¹⁹	16.9 ⁹	56.36 ²⁰	52.6 ²⁵	35.03 ²⁸	21.9 ³⁴	64.29 ²⁵	13.2 ¹¹
	15	6	16	25	22	35	20	15
Sept. 6.5	56.47	16.3	56.52	55.1	35.25	25.4	64.49	14.7
16.5	56.58 ¹¹	15.9 ⁴	56.64 ¹²	57.4 ²³	35.40 ¹⁵	28.9 ³⁵	64.63 ¹⁴	16.5 ¹⁸
26.5	56.65 ⁷	15.8 ¹	56.71 ⁷	59.5 ²¹	35.49 ⁹	32.3 ³⁴	64.71 ⁸	18.6 ²¹
Oct. 6.5	56.69 ⁴	15.9 ¹	56.75 ⁴	61.4 ¹⁹	35.52 ³	35.6 ³³	64.73 ²	20.8 ²²
16.4	56.70 ¹	16.3 ⁴	56.76 ¹	63.1 ¹⁷	35.48 ⁴	38.7 ³¹	64.70 ³	23.1 ²³
	3	5	3	14	9	28	7	22
26.4	56.67	16.8	56.73	64.5	35.39	41.5	64.63	25.3
Nov. 5.4	56.62 ⁵	17.3 ⁵	56.68 ⁵	65.7 ¹²	35.25 ¹⁴	44.0 ²⁵	64.52 ¹¹	27.4 ²¹
15.4	56.56 ⁶	18.0 ⁷	56.60 ⁸	66.6 ⁹	35.07 ¹⁸	46.2 ²²	64.37 ¹⁵	29.3 ¹⁹
25.3	56.48 ⁸	18.7 ⁷	56.50 ¹⁰	67.2 ⁶	34.85 ²²	48.0 ¹⁸	64.19 ¹⁸	30.9 ¹⁶
Dec. 5.3	56.38 ¹⁰	19.5 ⁸	56.39 ¹¹	67.4 ²	34.59 ²⁶	49.2 ¹²	64.00 ¹⁹	32.1 ¹²
	10	7	12	1	28	7	19	7
15.3	56.28	20.2	56.27	67.3	34.31	49.9	63.81	32.8
25.2	56.18 ¹⁰	20.8 ⁶	56.14 ¹³	66.9 ⁴	34.01 ³⁰	50.1 ²	63.61 ²⁰	33.1 ³
35.2	56.08 ¹⁰	21.4 ⁶	56.01 ¹³	66.2 ⁷	33.70 ³¹	49.7 ⁴	63.41 ²⁰	33.0 ¹
Sec δ , Tan δ	1.006	−0.109	1.139	+0.545	1.923	+1.643	1.446	−1.044
Mean Place	52°.969	39′′.31	53°.258	36′′.47	31°.687	11′′.83	59°.884	39′′.11
D' ψ α , D ∞ α	0.00	+0.01	0.00	−0.04	0.00	−0.11	0.00	+0.07
D ψ δ , D ∞ δ	+0.4	0.0	+0.4	0.0	+0.4	0.0	+0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	22 Andromedæ. Mag. 5.1		γ Pegasi. Mag. 2.9		σ Andromedæ. Mag. 4.5		ι Ceti. Mag. 3.8	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 0 5 s	° ' + 45 35 "	h m 0 8 s	° ' + 14 41 "	h m 0 13 s	° ' + 36 18 "	h m 0 14 s	° ' - 9 17 "
Jan. 0.2	46.73	30.3	44.82	63.2	46.04	21.2	59.58	86.9
10.2	46.53 ²⁰	29.5 ⁸	44.71 ¹¹	62.4 ⁸	45.89 ¹⁵	20.4 ⁸	59.48 ¹⁰	87.4 ⁵
20.2	46.34 ¹⁹	28.3 ¹²	44.61 ¹⁰	61.5 ⁹	45.74 ¹⁵	19.3 ¹¹	59.38 ¹⁰	87.7 ³
30.1	46.17 ¹⁷	26.7 ¹⁶	44.52 ⁹	60.5 ¹⁰	45.60 ¹⁴	17.9 ¹⁴	59.30 ⁸	87.9 ²
Feb. 9.1	46.03 ¹⁴	24.8 ¹⁹	44.44 ⁸	59.5 ¹⁰	45.48 ¹²	16.2 ¹⁷	59.23 ⁷	87.9 ⁰
	¹¹	²¹	⁵	⁹	⁹	¹⁸	⁵	²
19.1	45.92	22.7	44.39	58.6	45.39	14.4	59.18	87.7
Mar. 1.1	45.85 ⁷	20.4 ²³	44.36 ³	57.7 ⁹	45.33 ⁶	12.6 ¹⁸	59.15 ³	87.2 ⁵
11.0	45.83 ²	18.2 ²²	44.36 ⁰	56.9 ⁸	45.31 ²	10.8 ¹⁸	59.15 ⁰	86.5 ⁷
21.0	45.86 ³	16.1 ²¹	44.40 ⁴	56.4 ⁵	45.34 ³	9.1 ¹⁷	59.18 ³	85.6 ⁹
31.0	45.95 ⁹	14.1 ²⁰	44.48 ⁸	56.1 ³	45.42 ⁸	7.5 ¹⁶	59.25 ⁷	84.5 ¹¹
	¹⁵	¹⁷	¹³	⁰	¹³	¹³	¹¹	¹³
Apr. 10.0	46.10	12.4	44.61	56.1	45.55	6.2	59.36	83.2
19.9	46.31 ²¹	11.0 ¹⁴	44.77 ¹⁶	56.3 ²	45.73 ¹⁸	5.3 ⁹	59.52 ¹⁶	81.6 ¹⁶
29.9	46.57 ²⁶	10.0 ¹⁰	44.97 ²⁰	56.8 ⁵	45.96 ²³	4.7 ⁶	59.71 ¹⁹	79.8 ¹⁸
May 9.9	46.88 ³¹	9.5 ⁵	45.21 ²⁴	57.7 ⁹	46.24 ²⁸	4.5 ²	59.94 ²³	77.8 ²⁰
19.8	47.23 ³⁵	9.5 ⁰	45.49 ²⁸	58.9 ¹²	46.55 ³¹	4.8 ³	60.20 ²⁶	75.7 ²¹
	³⁸	⁴	³⁰	¹⁵	³⁴	⁷	²⁸	²¹
29.8	47.61	9.9	45.79	60.4	46.89	5.5	60.48	73.6
June 8.8	48.01 ⁴⁰	10.8 ⁹	46.11 ³²	62.1 ¹⁷	47.25 ³⁶	6.6 ¹¹	60.79 ³¹	71.4 ²²
18.8	48.43 ⁴²	12.1 ¹³	46.44 ³³	64.0 ¹⁹	47.62 ³⁷	8.0 ¹⁴	61.11 ³²	69.2 ²²
28.7	48.85 ⁴²	13.9 ¹⁸	46.77 ³³	66.1 ²¹	48.00 ³⁸	9.8 ¹⁸	61.44 ³³	67.1 ²¹
July 8.7	49.25 ⁴⁰	16.0 ²¹	47.10 ³³	68.2 ²¹	48.37 ³⁷	11.9 ²¹	61.77 ³³	65.1 ²⁰
	³⁸	²⁴	³¹	²²	³⁵	²⁴	³¹	¹⁸
18.7	49.63	18.4	47.41	70.4	48.72	14.3	62.08	63.3
28.7	49.98 ³⁵	21.1 ²⁷	47.70 ²⁹	72.7 ²³	49.05 ³³	16.9 ²⁶	62.37 ²⁹	61.7 ¹⁶
Aug. 7.6	50.30 ³²	24.0 ²⁹	47.96 ²⁶	74.9 ²²	49.35 ³⁰	19.6 ²⁷	62.64 ²⁷	60.4 ¹³
17.6	50.58 ²⁸	27.0 ³⁰	48.19 ²³	76.9 ²⁰	49.61 ²⁶	22.3 ²⁷	62.88 ²⁴	59.4 ¹⁰
27.6	50.81 ²³	30.1 ³¹	48.39 ²⁰	78.8 ¹⁹	49.83 ²²	25.1 ²⁸	63.08 ²⁰	58.6 ⁸
	¹⁸	³¹	¹⁶	¹⁸	¹⁸	²⁸	¹⁶	⁵
Sept. 6.5	50.99	33.2	48.55	80.6	50.01	27.9	63.24	58.1
16.5	51.12 ¹³	36.2 ³⁰	48.67 ¹²	82.2 ¹⁶	50.14 ¹³	30.5 ²⁶	63.37 ¹³	58.0 ¹
26.5	51.20 ⁸	39.2 ³⁰	48.75 ⁸	83.6 ¹⁴	50.23 ⁹	33.0 ²⁵	63.46 ⁹	58.1 ¹
Oct. 6.5	51.24 ⁴	42.0 ²⁸	48.80 ⁵	84.7 ¹¹	50.28 ⁵	35.4 ²⁴	63.51 ⁵	58.4 ³
16.4	51.24 ⁰	44.6 ²⁶	48.81 ¹	85.6 ⁹	50.29 ¹	37.5 ²¹	63.53 ²	58.9 ⁵
	⁵	²³	²	⁷	²	¹⁹	²	⁷
26.4	51.19	46.9	48.79	86.3	50.27	39.4	63.51	59.6
Nov. 5.4	51.11 ⁸	48.9 ²⁰	48.75 ⁴	86.7 ⁴	50.22 ⁵	41.0 ¹⁶	63.47 ⁴	60.4 ⁸
15.4	50.99 ¹²	50.5 ¹⁶	48.69 ⁶	86.9 ²	50.14 ⁸	42.2 ¹²	63.41 ⁶	61.2 ⁸
25.3	50.85 ¹⁴	51.7 ¹²	48.61 ⁸	86.9 ⁰	50.03 ¹¹	43.1 ⁹	63.34 ⁷	62.1 ⁹
Dec. 5.3	50.68 ¹⁷	52.5 ⁸	48.52 ⁹	86.7 ²	49.91 ¹²	43.7 ⁶	63.25 ⁹	62.9 ⁸
	¹⁸	⁴	¹⁰	⁴	¹⁴	²	¹⁰	⁷
15.3	50.50	52.9	48.42	86.3	49.77	43.9	63.15	63.6
25.2	50.31 ¹⁹	52.8 ¹	48.32 ¹⁰	85.8 ⁵	49.62 ¹⁵	43.7 ²	63.05 ¹⁰	64.3 ⁷
35.2	50.12 ¹⁹	52.3 ⁵	48.21 ¹¹	85.1 ⁷	49.47 ¹⁵	43.1 ⁶	62.94 ¹¹	64.9 ⁶
Sec δ, Tan δ	1.429	+1.021	1.034	+0.262	1.241	+0.735	1.013	-0.164
Mean Place	47°.680	17''.31	45°.248	59''.77	46°.740	10''.48	59°.731	82''.07
D'ψ a, Dω a	0.00	-0.07	0.00	-0.02	0.00	-0.05	0.00	+0.01
Dψ δ, Dω δ	+0.4	0.0	+0.4	0.0	+0.4	+0.1	+0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Tucanæ. Mag. 4.3		44 Piscium. Mag. 6.0		β Hydri. Mag. 2.9		α Phœnicis. Mag. 2.4	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 0 15 s	° ' -65 22 "	h m 0 20 s	° ' + 1 27 "	h m 0 21 s	° ' -77 44 "	h m 0 21 s	° ' -42 46 "
Jan. 0.2	33.73	87.9	56.32	27.6	13.91	59.3	59.53	57.2
10.2	33.34 39	87.0 9	56.22 10	27.0 6	13.02 89	58.2 11	59.35 18	57.0 2
20.2	32.98 36	85.5 15	56.12 10	26.4 6	12.19 83	56.5 17	59.18 17	56.4 6
30.2	32.66 32	83.5 20	56.03 9	25.9 5	11.45 74	54.3 22	59.03 15	55.3 11
Feb. 9.1	32.38 28	81.1 24	55.96 7	25.4 5	10.81 64	51.6 27	58.90 13	53.8 15
	22	28	6	3	53	31	10	18
19.1	32.16	78.3	55.90	25.1	10.28	48.5	58.80	52.0
Mar. 1.1	32.01 15	75.1 32	55.86 4	25.0 1	9.89 39	45.0 35	58.73 7	49.9 21
	8		0	0	24		3	
11.0	31.93	71.7 34	55.86	25.0	9.65	41.3 37	58.70 3	47.4 25
21.0	31.93 0	68.1 36	55.89 3	25.2 2	10	37.5 38	58.72 2	44.6 28
31.0	32.01 8	64.4 37	55.96 7	25.7 5	6	33.6 39	58.78 6	41.7 29
	16	38	10	7	22	39	11	30
Apr. 10.0	32.17	60.6	56.06	26.4	9.83	29.7	58.89	38.7
19.9	32.41 24	56.9 37	56.21 15	27.4 10	10.20 37	25.9 38	59.05 16	35.6 31
29.9	32.73 32	53.3 36	56.40 19	28.6 12	10.72 52	22.2 37	59.26 21	32.4 32
May 9.9	33.12 39	49.9 34	56.62 22	30.1 15	11.38 66	18.8 34	59.51 25	29.3 31
19.9	33.58 46	46.8 31	56.88 26	31.8 17	12.17 79	15.8 30	59.81 30	26.4 29
	52	28	29	19	89	27	34	28
29.8	34.10	44.0	57.17	33.7	13.06	13.1	60.15	23.6
June 8.8	34.67 57	41.7 23	57.47 30	35.7 20	14.05 99	10.8 23	60.51 36	21.1 25
18.8	35.27 60	39.8 19	57.79 32	37.7 20	15.11 106	9.1 17	60.90 39	18.9 22
28.7	35.88 61	38.3 15	58.12 33	39.8 21	16.20 109	7.9 12	61.30 40	17.0 19
July 8.7	36.50 62	37.4 9	58.44 32	41.9 21	17.30 110	7.3 6	61.70 40	15.6 14
	61	3	31	20	109	1	38	10
18.7	37.11	37.1	58.75	43.9	18.39	7.2	62.08	14.6
28.7	37.68 57	37.3 2	59.04 29	45.8 19	19.43 104	7.7 5	62.45 37	14.1 5
Aug. 7.6	38.21 53	38.0 7	59.30 26	47.5 17	20.39 96	8.8 11	62.79 34	14.0 1
17.6	38.67 46	39.3 13	59.54 24	49.0 15	21.24 85	10.4 16	63.09 30	14.4 4
27.6	39.06 39	41.1 18	59.75 21	50.3 13	21.95 71	12.5 21	63.34 25	15.3 9
	31	21	17	11	56	24	21	13
Sept. 6.6	39.37	43.2	59.92	51.4	22.51	14.9	63.55	16.6
16.5	39.59 22	45.6 24	60.05 13	52.2 8	22.90 39	17.6 27	63.71 16	18.2 16
26.5	39.71 12	48.3 27	60.14 9	52.8 6	23.10 20	20.5 29	63.81 10	20.1 19
Oct. 6.5	39.73 2	51.1 28	60.20 6	53.1 3	23.10 0	23.5 30	63.86 5	22.2 21
16.4	39.66 7	53.9 28	60.22 2	53.2 1	22.92 18	26.5 30	63.86 0	24.4 22
	15	27	0	1	35	28	5	22
26.4	39.51	56.6	60.22	53.1	22.57	29.3	63.81	26.6
Nov. 5.4	39.28 23	59.0 24	60.19 3	52.9 2	22.05 52	31.8 25	63.73 8	28.7 21
15.4	38.98 30	61.1 21	60.14 5	52.5 4	21.39 66	34.0 22	63.61 12	30.7 20
25.3	38.63 35	62.8 17	60.07 7	52.0 5	20.62 77	35.7 17	63.46 15	32.4 17
Dec. 5.3	38.25 38	64.0 12	59.99 8	51.4 6	19.77 85	36.8 11	63.30 16	33.7 13
	40	6	9	6	91	5	18	10
15.3	37.85	64.6	59.90	50.8	18.86	37.3	63.12	34.7
25.3	37.44 41	64.7 1	59.80 10	50.2 6	17.93 93	37.2 1	62.94 18	35.3 6
35.2	37.03 41	64.2 5	59.70 10	49.5 7	17.02 91	36.5 7	62.76 18	35.4 1
Sec δ, Tan δ	2.401	-2.183	1.000	+0.025	4.710	-4.603	1.363	-0.925
Mean Place	32°.892	68''.63	56°.538	28''.44	11°.823	39''.20	59°.227	42''.40
D' α, D α	0.00	+0.15	0.00	0.00	-0.01	+0.31	0.00	+0.06
D δ, D α δ	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	12 Ceti. Mag. 6.0		18 Ceti. Mag. 5.2		ζ Cassiopeiæ. Mag. 3.7		π Androm. Mag. 4	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	
	h m 0 25 s	° ' " — 4 25 "	h m 0 30 s	° ' " — 4 3 "	h m 0 32 s	° ' " + 53 24 "	h m 0 32 s	
Jan. 0.2	35.81	79.1	46.06	80.1	6.15	81.7	13.31	
10.2	35.71 ¹⁰	79.6 ⁵	45.96 ¹⁰	80.7 ⁶	5.90 ²⁵	81.3 ⁴	13.17 ¹⁴	
20.2	35.61 ¹⁰	80.1 ⁵	45.86 ¹⁰	81.2 ⁵	5.65 ²⁵	80.4 ⁹	13.02 ¹⁵	
30.2	35.52 ⁹	80.4 ³	45.77 ⁹	81.6 ⁴	5.41 ²⁴	79.0 ¹⁴	12.88 ¹⁴	
Feb. 9.1	35.45 ⁷	80.6 ²	45.69 ⁸	81.8 ²	5.20 ²¹	77.3 ¹⁷	12.76 ¹²	
	6	0	7	0	18	21	10	
19.1	35.39	80.6	45.62	81.8	5.02	75.2	12.66	
Mar. 1.1	35.35 ⁴	80.5 ¹	45.58 ⁴	81.7 ¹	4.89 ¹³	72.9 ²³	12.59 ⁷	
11.1	35.34 ¹	80.1 ⁴	45.57 ¹	81.3 ⁴	4.81 ⁸	70.5 ²⁴	12.56 ³	
21.0	35.36 ²	79.5 ⁶	45.59 ²	80.7 ⁶	4.80 ¹	68.1 ²⁴	12.57 ¹	
31.0	35.42 ⁶	78.7 ⁸	45.64 ⁵	79.9 ⁸	4.85 ⁵	65.8 ²³	12.62 ⁵	
	10	11	10	10	13	21	11	
Apr. 10.0	35.52	77.6	45.74	78.9	4.98	63.7	12.73	
19.9	35.66 ¹⁴	76.3 ¹³	45.88 ¹⁴	77.6 ¹³	5.18 ²⁰	61.9 ¹⁸	12.89 ¹⁶	
29.9	35.85 ¹⁹	74.7 ¹⁶	46.06 ¹⁸	76.1 ¹⁵	5.44 ²⁶	60.4 ¹⁵	13.09 ²⁰	
May 9.9	36.07 ²²	73.0 ¹⁷	46.27 ²¹	74.3 ¹⁸	5.76 ³²	59.3 ¹¹	13.34 ²⁵	
19.9	36.32 ²⁵	71.1 ¹⁹	46.52 ²⁵	72.4 ¹⁹	6.13 ³⁷	58.7 ⁶	13.63 ²⁹	
	28	21	28	20	42	1	33	
29.8	36.60	69.0	46.80	70.4	6.55	58.6	13.96	
June 8.8	36.90 ³⁰	66.9 ²¹	47.10 ³⁰	68.3 ²¹	7.00 ⁴⁵	59.0 ⁴	14.31 ³⁵	
18.8	37.22 ³²	64.8 ²¹	47.42 ³²	66.1 ²²	7.47 ⁴⁷	59.9 ⁹	14.67 ³⁶	
28.8	37.55 ³³	62.7 ²¹	47.75 ³³	64.0 ²¹	7.94 ⁴⁷	61.2 ¹³	15.04 ³⁷	
July 8.7	37.87 ³²	60.6 ²¹	48.07 ³²	62.0 ²⁰	8.41 ⁴⁷	63.0 ¹⁸	15.40 ³⁶	
	31	19	31	19	45	21	35	
18.7	38.18	58.7	48.38	60.1	8.86	65.1	15.75	
28.7	38.48 ³⁰	57.0 ¹⁷	48.68 ³⁰	58.3 ¹⁸	9.28 ⁴²	67.5 ²⁴	16.08 ³³	
Aug. 7.6	38.75 ²⁷	55.5 ¹⁵	48.96 ²⁸	56.8 ¹⁵	9.67 ³⁹	70.3 ²⁸	16.39 ³¹	
17.6	38.99 ²⁴	54.2 ¹³	49.21 ²⁵	55.5 ¹³	10.01 ³⁴	73.3 ³⁰	16.66 ²⁷	
27.6	39.20 ²¹	53.2 ¹⁰	49.42 ²¹	54.4 ¹¹	10.31 ³⁰	76.4 ³¹	16.89 ²³	
	17	8	18	7	24	32	20	
Sept. 6.6	39.37	52.4	49.60	53.7	10.55	79.6	17.09	
16.5	39.51 ¹⁴	52.0 ⁴	49.74 ¹⁴	53.2 ⁵	10.74 ¹⁹	82.9 ³³	17.25 ¹⁶	
26.5	39.61 ¹⁰	51.8 ²	49.84 ¹⁰	53.0 ²	10.88 ¹⁴	86.1 ³²	17.36 ¹¹	
Oct. 6.5	39.67 ⁶	51.8 ⁰	49.91 ⁷	53.0 ⁰	10.96 ⁸	89.2 ³¹	17.44 ⁸	
16.5	39.70 ³	52.0 ²	49.94 ³	53.2 ²	10.99 ³	92.1 ²⁹	17.48 ⁴	
	0	5	0	4	2	27	0	
26.4	39.70	52.5	49.94	53.6	10.97	94.8	17.48	
Nov. 5.4	39.67 ³	53.1 ⁶	49.92 ²	54.2 ⁶	10.90 ⁷	97.3 ²⁵	17.45 ³	
15.4	39.62 ⁵	53.7 ⁶	49.88 ⁴	54.8 ⁶	10.79 ¹¹	99.5 ²²	17.39 ⁶	
25.3	39.55 ⁷	54.4 ⁷	49.82 ⁶	55.5 ⁷	10.64 ¹⁵	101.3 ¹⁸	17.31 ⁸	
Dec. 5.3	39.47 ⁸	55.2 ⁸	49.74 ⁸	56.3 ⁸	10.46 ¹⁸	102.6 ¹³	17.21 ¹⁰	
	9	7	9	7	21	8	12	
15.3	39.38	55.9	49.65	57.0	10.25	103.4	17.09	
25.3	39.28 ¹⁰	56.6 ⁷	49.55 ¹⁰	57.7 ⁷	10.02 ²³	103.8 ⁴	16.96 ¹³	
35.2	39.18 ¹⁰	57.2 ⁶	49.45 ¹⁰	58.3 ⁶	9.77 ²⁵	103.7 ¹	16.82 ¹⁴	
Sec δ, Tan δ	1.003	−0.078	1.003	−0.071	1.678	+1.347	1.196	
Mean Place	35°.947	76'' .33	46°.167	77'' .72	7°.076	65'' .71	13°.829	2
D'ψ a, Dω a	0.00	+0.01	0.00	0.00	0.00	−0.09	0.00	
Dψ δ, Dω δ	+0.4	+0.1	+0.4	+0.1	+0.4	+0.1	+0.4	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Andromedæ. Mag. 4.5		δ Andromedæ. Mag. 3.5		α Cassiopeiæ. Var. 2.2-2.8		μ Phœnicis. Mag. 4.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 0 33	° ' +28 50	h m 0 34	° ' +30 23	h m 0 35	° ' +56 3	h m 0 37	° ' -46 33
	s	"	s	"	s	"	s	"
Jan. 0.2	56.85	31.4	39.88	15.4	32.76	54.1	13.42	61.3
10.2	56.72 ¹³	30.7 ⁷	39.75 ¹³	14.7 ⁷	32.48 ²⁸	53.7 ⁴	13.22 ²⁰	61.2 ¹
20.2	56.59 ¹³	29.8 ⁹	39.61 ¹⁴	13.8 ⁹	32.20 ²⁸	52.8 ⁹	13.02 ²⁰	60.6 ⁶
30.2	56.46 ¹³	28.7 ¹¹	39.48 ¹³	12.7 ¹¹	31.94 ²⁶	51.5 ¹³	12.84 ¹⁸	59.5 ¹¹
Feb. 9.1	56.35 ¹¹	27.4 ¹³	39.36 ¹²	11.3 ¹⁴	31.71 ²³	49.8 ¹⁷	12.68 ¹⁶	58.0 ¹⁵
	10	14	9	15	20	21	14	19
19.1	56.25	26.0	39.27	9.8	31.51	47.7	12.54	56.1
Mar. 1.1	56.18 ⁷	24.5 ¹⁵	39.20 ⁷	8.3 ¹⁵	31.36 ¹⁵	45.4 ²³	12.44 ¹⁰	53.8 ²³
11.1	56.15 ³	23.0 ¹⁵	39.16 ⁴	6.8 ¹⁵	31.27 ⁹	43.0 ²⁴	12.38 ⁶	51.2 ²⁶
21.0	56.16 ¹	21.7 ¹³	39.17 ¹	5.4 ¹⁴	31.24 ³	40.5 ²⁵	12.37 ¹	48.3 ²⁹
31.0	56.22 ⁶	20.6 ¹¹	39.23 ⁶	4.2 ¹²	31.29 ⁵	38.1 ²⁴	12.40 ³	45.2 ³¹
	10	9	10	10	12	22	9	32
Apr. 10.0	56.32	19.7	39.33	3.2	31.41	35.9	12.49	42.0
19.9	56.47 ¹⁵	19.0 ⁷	39.48 ¹⁵	2.5 ⁷	31.61 ²⁰	33.9 ²⁰	12.63 ¹⁴	38.7 ³³
29.9	56.66 ¹⁹	18.7 ³	39.68 ²⁰	2.1 ⁴	31.88 ²⁷	32.3 ¹⁶	12.82 ¹⁹	35.4 ³³
May 9.9	56.90 ²⁴	18.8 ¹	39.92 ²⁴	2.1 ⁰	32.22 ³⁴	31.1 ¹²	13.07 ²⁵	32.2 ³²
19.9	57.18 ²⁸	19.3 ⁵	40.20 ²⁸	2.5 ⁴	32.61 ³⁹	30.4 ⁷	13.36 ²⁹	29.1 ³¹
	31	8	32	7	43	3	34	29
29.8	57.49	20.1	40.52	3.2	33.04	30.1	13.70	26.2
June 8.8	57.83 ³⁴	21.2 ¹¹	40.86 ³⁴	4.3 ¹¹	33.51 ⁴⁷	30.3 ²	14.07 ³⁷	23.5 ²⁷
18.8	58.18 ³⁵	22.7 ¹⁵	41.21 ³⁵	5.8 ¹⁵	34.00 ⁴⁹	31.1 ⁸	14.46 ³⁹	21.1 ²⁴
28.8	58.54 ³⁶	24.5 ¹⁸	41.57 ³⁶	7.5 ¹⁷	34.50 ⁵⁰	32.3 ¹²	14.87 ⁴¹	19.2 ¹⁹
July 8.7	58.89 ³⁵	26.5 ²⁰	41.93 ³⁶	9.5 ²⁰	34.99 ⁴⁹	34.0 ¹⁷	15.28 ⁴¹	17.7 ¹⁵
	34	22	35	22	48	21	41	10
18.7	59.23	28.7	42.28	11.7	35.47	36.1	15.69	16.7
28.7	59.55 ³²	31.1 ²⁴	42.61 ³³	14.1 ²⁴	35.92 ⁴⁵	38.5 ²⁴	16.08 ³⁹	16.1 ⁶
Aug. 7.6	59.85 ³⁰	33.5 ²⁴	42.91 ³⁰	16.6 ²⁵	36.33 ⁴¹	41.2 ²⁷	16.44 ³⁶	16.0 ¹
17.6	60.12 ²⁷	36.0 ²⁵	43.18 ²⁷	19.1 ²⁵	36.70 ³⁷	44.1 ²⁹	16.77 ³³	16.5 ⁵
27.6	60.35 ²³	38.4 ²⁴	43.41 ²³	21.6 ²⁵	37.01 ³¹	47.3 ³²	17.05 ²⁸	17.4 ⁹
	19	24	19	24	26	33	24	13
Sept. 6.6	60.54	40.8	43.60	24.0	37.27	50.6	17.29	18.7
16.5	60.69 ¹⁵	43.1 ²³	43.76 ¹⁶	26.3 ²³	37.48 ²¹	53.9 ³³	17.47 ¹⁸	20.4 ¹⁷
26.5	60.80 ¹¹	45.2 ²¹	43.88 ¹²	28.5 ²²	37.63 ¹⁵	57.2 ³³	17.59 ¹²	22.5 ²¹
Oct. 6.5	60.88 ⁸	47.1 ¹⁹	43.96 ⁸	30.5 ²⁰	37.72 ⁹	60.4 ³²	17.66 ⁷	24.8 ²³
16.5	60.92 ⁴	48.8 ¹⁷	44.00 ⁴	32.3 ¹⁸	37.75 ³	63.4 ³⁰	17.68 ²	27.2 ²⁴
	1	15	1	16	2	29	4	24
26.4	60.93	50.3	44.01	33.9	37.73	66.3	17.64	29.6
Nov. 5.4	60.90 ³	51.5 ¹²	43.98 ³	35.2 ¹³	37.66 ⁷	68.9 ²⁶	17.55 ⁹	31.9 ²³
15.4	60.85 ⁵	52.5 ¹⁰	43.93 ⁵	36.3 ¹¹	37.54 ¹²	71.2 ²³	17.43 ¹²	34.0 ²¹
25.3	60.78 ⁷	53.2 ⁷	43.86 ⁷	37.1 ⁸	37.38 ¹⁶	73.1 ¹⁹	17.28 ¹⁵	35.9 ¹⁹
Dec. 5.3	60.69 ⁹	53.6 ⁴	43.76 ¹⁰	37.6 ⁵	37.18 ²⁰	74.5 ¹⁴	17.10 ¹⁸	37.4 ¹⁵
	11	1	11	1	23	10	20	11
15.3	60.58	53.7	43.65	37.7	36.95	75.5	16.90	38.5
25.3	60.46 ¹²	53.5 ²	43.53 ¹²	37.5 ²	36.70 ²⁵	76.0 ⁵	16.70 ²⁰	39.2 ⁷
35.2	60.33 ¹³	53.0 ⁵	43.40 ¹³	37.1 ⁴	36.43 ²⁷	76.0 ⁰	16.49 ²¹	39.4 ²
Sec δ, Tan δ	1.142	+0.551	1.159	+0.586	1.791	+1.486	1.455	-1.056
Mean Place	57°.295	22''.26	40°.340	5''.70	33°.725	37''.32	12°.926	46''.17
D'ψ a, Dω a	0.00	-0.04	0.00	-0.04	+0.01	-0.10	0.00	+0.07
Dψ δ, Dω δ	+0.4	+0.1	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Ceti. Mag. 2.2		α Cassiopeiæ. Mag. 4.7		δ Cassiopeiæ. Mag. 5.6		ζ Andromedæ. Mag. 4.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 0 39 s	° ' — 18 27 "	h m 0 39 s	° ' + 47 48 "	h m 0 39 s	° ' + 74 30 "	h m 0 42 s	° ' + 23 4 "
Jan. 0.3	13.49	57.1	51.58	45.3	50.80	65.9	43.13	46.5
10.2	13.38 ¹¹	57.5 ⁴	51.37 ²¹	44.9 ⁴	50.09 ⁷¹	65.9 ⁰	43.00 ¹³	45.8
20.2	13.26 ¹²	57.7 ²	51.16 ²¹	44.0 ⁹	49.39 ⁷⁰	65.3 ⁶	42.88 ¹²	45.0
30.2	13.15 ¹¹	57.6 ¹	50.96 ²⁰	42.7 ¹³	48.72 ⁶⁷	64.2 ¹¹	42.76 ¹²	44.0 ¹⁰
Feb. 9.1	13.06 ⁹	57.2 ⁴	50.78 ¹⁸	41.1 ¹⁶	48.11 ⁶¹	62.5 ¹⁷	42.65 ¹¹	42.9 ¹¹
	8	6	16	19	52	21	9	12
19.1	12.98	56.6	50.62	39.2	47.59	60.4	42.56	41.7
Mar. 1.1	12.92 ⁶	55.7 ⁹	50.50 ¹²	37.1 ²¹	47.18 ⁴¹	57.9 ²⁵	42.49 ⁷	40.5 ¹²
11.1	12.90 ²	54.5 ¹²	50.43 ⁷	34.9 ²²	46.89 ²⁹	55.1 ²⁸	42.46 ³	39.3 ¹²
21.0	12.91 ¹	53.1 ¹⁴	50.42 ¹	32.8 ²¹	46.75 ¹⁴	52.2 ²⁹	42.46 ⁰	38.2 ¹¹
31.0	12.95 ⁴	51.4 ¹⁷	50.47 ⁵	30.7 ²¹	46.77 ²	49.3 ²⁹	42.50 ⁴	37.4 ⁸
	8	19	10	19	17	28	9	6
Apr. 10.0	13.03	49.5	50.57	28.8	46.94	46.5	42.59	36.8
20.0	13.16 ¹³	47.4 ²¹	50.74 ¹⁷	27.2 ¹⁶	47.27 ³³	43.9 ²⁶	42.73 ¹⁴	36.4 ⁴
29.9	13.33 ¹⁷	45.2 ²²	50.97 ²³	25.9 ¹³	47.74 ⁴⁷	41.6 ²³	42.91 ¹⁸	36.4 ⁶
May 9.9	13.54 ²¹	42.9 ²³	51.26 ²⁹	25.0 ⁹	48.34 ⁶⁰	39.7 ¹⁹	43.14 ²³	36.7 ³
19.9	13.79 ²⁵	40.5 ²⁴	51.60 ³⁴	24.6 ⁴	49.05 ⁷¹	38.3 ¹⁴	43.40 ²⁶	37.3 ⁶
	28	25	38	1	79	9	30	10
29.8	14.07	38.0	51.98	24.7	49.84	37.4	43.70	38.3
June 8.8	14.38 ³¹	35.6 ²⁴	52.38 ⁴⁰	25.2 ⁵	50.70 ⁸⁶	37.0 ⁴	44.02 ³²	39.6 ¹³
18.8	14.70 ³²	33.3 ²³	52.80 ⁴²	26.1 ⁹	51.60 ⁹⁰	37.2 ²	44.36 ³⁴	41.1 ¹⁵
28.8	15.03 ³³	31.1 ²²	53.23 ⁴³	27.4 ¹³	52.52 ⁹²	37.9 ⁷	44.71 ³⁵	42.9 ¹⁸
July 8.7	15.36 ³³	29.1 ²⁰	53.66 ⁴³	29.1 ¹⁷	53.43 ⁹¹	39.2 ¹³	45.05 ³⁴	44.9 ²⁰
	33	17	42	21	88	17	33	22
18.7	15.69	27.4	54.08	31.2	54.31	40.9	45.38	47.1
28.7	16.00 ³¹	26.0 ¹⁴	54.48 ⁴⁰	33.7 ²⁵	55.14 ⁸³	43.1 ²²	45.70 ³²	49.3 ²²
Aug. 7.6	16.29 ²⁹	25.0 ¹⁰	54.84 ³⁶	36.4 ²⁷	55.90 ⁷⁶	45.7 ²⁶	46.00 ³⁰	51.6 ²³
17.6	16.55 ²⁶	24.3 ⁷	55.16 ³²	39.2 ²⁸	56.58 ⁶⁸	48.7 ³⁰	46.26 ²⁶	53.9 ²³
27.6	16.78 ²³	23.9 ⁴	55.44 ²⁸	42.1 ²⁹	57.17 ⁵⁹	52.0 ³³	46.49 ²³	56.1 ²²
	19	0	24	30	48	35	20	22
Sept. 6.6	16.97	23.9	55.68	45.1	57.65	55.5	46.69	58.3
16.5	17.12 ¹⁵	24.2 ³	55.87 ¹⁹	48.2 ³¹	58.02 ³⁷	59.1 ³⁶	46.85 ¹⁶	60.3 ²⁰
26.5	17.23 ¹¹	24.8 ⁶	56.01 ¹⁴	51.2 ³⁰	58.27 ²⁵	62.8 ³⁷	46.97 ¹²	62.1 ¹⁸
Oct. 6.5	17.31 ⁸	25.7 ⁹	56.10 ⁹	54.1 ²⁹	58.41 ¹⁴	66.6 ³⁸	47.06 ⁹	63.7 ¹⁶
16.5	17.35 ⁴	26.8 ¹¹	56.15 ⁵	56.8 ²⁷	58.42 ¹	70.3 ³⁷	47.11 ⁵	65.2 ¹⁵
	0	12	0	25	10	35	2	12
26.4	17.35	28.0	56.15	59.3	58.32	73.8	47.13	66.4
Nov. 5.4	17.33 ²	29.3 ¹³	56.11 ⁴	61.5 ²²	58.11 ²¹	77.1 ³³	47.12 ¹	67.4 ¹⁰
15.4	17.28 ⁵	30.6 ¹³	56.03 ⁸	63.4 ¹⁹	57.78 ³³	80.1 ³⁰	47.08 ⁴	68.1
25.3	17.21 ⁷	31.8 ¹²	55.92 ¹¹	65.0 ¹⁶	57.35 ⁴³	82.7 ²⁶	47.02 ⁶	68.6
Dec. 5.3	17.12 ⁹	32.9 ¹¹	55.78 ¹⁴	66.2 ¹²	56.83 ⁵²	84.8 ²¹	46.94 ⁸	68.8
	10	10	17	7	59	16	10	
15.3	17.02	33.9	55.61	66.9	56.24	86.4	46.84	68.8
25.3	16.91 ¹¹	34.7 ⁸	55.42 ¹⁹	67.2 ³	55.59 ⁶⁵	87.4 ¹⁰	46.73 ¹¹	68.6
35.2	16.79 ¹²	35.3 ⁶	55.21 ²¹	67.1 ¹	54.90 ⁶⁹	87.9 ⁵	46.62 ¹¹	68.1
Sec δ , Tan δ	1.054	−0.334	1.489	+1.103	3.746	+3.610	1.093	+0.441
Mean Place	13 ^h .394	50 ^m '' .02	52 ^h .291	30 ^m '' .35	52 ^h .886	45 ^m '' .79	43 ^h .448	38 ^m '' .66
D ψ α , D ω α	0.00	+0.02	+0.01	−0.07	+0.02	−0.24	0.00	−0.03
D ψ δ , D ω δ	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Cassiopeiæ. Mag. 3.6		δ Piscium. Mag. 4.6		λ Hydri. Mag. 5.0		ϵ Ceti. Mag. 4.9	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 0 43	° ' + 57 21	h m 0 44	° ' + 7 6	h m 0 45	° ' - 75 23	h m 0 48	° ' - 1 36
	s	"	s	"	s	"	s	"
Jan. 0.3	48.82	36.1	9.89	44.5	37.12	67.3	33.59	59.7
10.2	48.54 ²⁸	35.8 ³	9.79 ¹⁰	43.9 ⁶	36.36 ⁷⁶	66.6 ⁷	33.49 ¹⁰	60.3 ⁶
20.2	48.25 ²⁹	35.1 ⁷	9.68 ¹¹	43.2 ⁷	35.61 ⁷⁵	65.3 ¹³	33.38 ¹¹	60.9 ⁶
30.2	47.97 ²⁸	33.8 ¹³	9.58 ¹⁰	42.5 ⁷	34.91 ⁷⁰	63.4 ¹⁹	33.28 ¹⁰	61.3 ⁴
Feb. 9.1	47.72 ²⁵	32.1 ¹⁷	9.49 ⁹	41.9 ⁶	34.29 ⁶²	61.0 ²⁴	33.19 ⁹	61.6 ³
	21	20	8	5	53	28	8	1
19.1	47.51	30.1	9.41	41.4	33.76	58.2	33.11	61.7
Mar. 1.1	47.34 ¹⁷	27.8 ²³	9.36 ⁵	41.0 ⁴	33.33 ⁴³	55.0 ³²	33.05 ⁶	61.7 ⁰
11.1	47.23 ¹¹	25.4 ²⁴	9.33 ³	40.7 ³	33.01 ³²	51.5 ³⁵	33.02 ³	61.5 ²
21.0	47.19 ⁴	22.9 ²⁵	9.33 ⁰	40.6 ¹	32.82 ¹⁹	47.8 ³⁷	33.02 ⁰	61.1 ⁴
31.0	47.23 ⁴	20.4 ²⁵	9.37 ⁴	40.7 ¹	32.75 ⁷	43.9 ³⁹	33.06 ⁴	60.5 ⁶
	12	23	9	4	7	39	8	9
Apr. 10.0	47.35	18.1	9.46	41.1	32.82	40.0	33.14	59.6
20.0	47.54 ¹⁹	16.0 ²¹	9.59 ¹³	41.7 ⁶	33.03 ²¹	36.2 ³⁸	33.26 ¹²	58.5 ¹¹
29.9	47.81 ²⁷	14.3 ¹⁷	9.76 ¹⁷	42.6 ⁹	33.37 ³⁴	32.5 ³⁷	33.42 ¹⁶	57.1 ¹⁴
May 9.9	48.15 ³⁴	13.0 ¹³	9.97 ²¹	43.8 ¹²	33.83 ⁴⁶	28.9 ³⁶	33.62 ²⁰	55.5 ¹⁶
19.9	48.55 ⁴⁰	12.1 ⁹	10.21 ²⁴	45.2 ¹⁴	34.41 ⁵⁸	25.6 ³³	33.86 ²⁴	53.7 ¹⁸
	44	4	28	16	69	29	27	20
29.8	48.99	11.7	10.49	46.8	35.10	22.7	34.13	51.7
June 8.8	49.47 ⁴⁸	11.8 ¹	10.79 ³⁰	48.6 ¹⁸	35.87 ⁷⁷	20.2 ²⁵	34.42 ²⁹	49.7 ²⁰
18.8	49.98 ⁵¹	12.4 ⁶	11.11 ³²	50.5 ¹⁹	36.72 ⁸⁵	18.1 ²¹	34.73 ³¹	47.6 ²¹
28.8	50.50 ⁵²	13.5 ¹¹	11.43 ³²	52.5 ²⁰	37.62 ⁹⁰	16.5 ¹⁶	35.05 ³²	45.5 ²¹
July 8.7	51.01 ⁵¹	15.0 ¹⁵	11.76 ³³	54.6 ²¹	38.54 ⁹²	15.5 ¹⁰	35.38 ³³	43.4 ²¹
	50	20	32	21	92	4	32	20
18.7	51.51	17.0	12.08	56.7	39.46	15.1	35.70	41.4
28.7	51.98 ⁴⁷	19.4 ²⁴	12.38 ³⁰	58.7 ²⁰	40.35 ⁸⁹	15.3 ²	36.00 ³⁰	39.6 ¹⁸
Aug. 7.7	52.42 ⁴⁴	22.0 ²⁶	12.66 ²⁸	60.6 ¹⁹	41.19 ⁸⁴	16.0 ⁷	36.28 ²⁸	38.0 ¹⁶
17.6	52.81 ³⁹	24.9 ²⁹	12.91 ²⁵	62.3 ¹⁷	41.96 ⁷⁷	17.2 ¹²	36.54 ²⁶	36.6 ¹⁴
27.6	53.15 ³⁴	28.0 ³¹	13.13 ²²	63.8 ¹⁵	42.62 ⁶⁶	19.0 ¹⁸	36.77 ²³	35.4 ¹²
	28	32	19	14	53	22	19	9
Sept. 6.6	53.43	31.2	13.32	65.2	43.15	21.2	36.96	34.5
16.5	53.66 ²³	34.5 ³³	13.48 ¹⁶	66.3 ¹¹	43.55 ⁴⁰	23.8 ²⁶	37.11 ¹⁵	33.9 ⁶
26.5	53.83 ¹⁷	37.8 ³³	13.60 ¹²	67.2 ⁹	43.80 ²⁵	26.7 ²⁹	37.23 ¹²	33.5 ⁴
Oct. 6.5	53.94 ¹¹	41.0 ³²	13.68 ⁸	67.9 ⁷	43.89 ⁹	29.7 ³⁰	37.32 ⁹	33.4 ¹
16.5	54.00 ⁶	44.1 ³¹	13.73 ⁵	68.3 ⁴	43.82 ⁷	32.7 ³⁰	37.37 ⁵	33.5 ¹
	0	29	2	2	22	30	2	3
26.4	54.00	47.0	13.75	68.5	43.60	35.7	37.39	33.8
Nov. 5.4	53.94 ⁶	49.7 ²⁷	13.74 ¹	68.5 ⁰	43.23 ³⁷	38.5 ²⁸	37.39 ⁰	34.2 ⁴
15.4	53.83 ¹¹	52.1 ²⁴	13.71 ³	68.4 ¹	42.74 ⁴⁹	40.9 ²⁴	37.36 ³	34.8 ⁶
25.4	53.68 ¹⁵	54.1 ²⁰	13.66 ⁵	68.2 ²	42.14 ⁶⁰	42.9 ²⁰	37.31 ⁵	35.5 ⁷
Dec. 5.3	53.49 ¹⁹	55.7 ¹⁶	13.59 ⁷	67.8 ⁴	41.45 ⁶⁹	44.4 ¹⁵	37.24 ⁷	36.2 ⁷
	23	11	8	5	74	9	8	7
15.3	53.26	56.8	13.51	67.3	40.71	45.3	37.16	36.9
25.3	53.00 ²⁶	57.4 ⁶	13.41 ¹⁰	66.7 ⁶	39.93 ⁷⁸	45.6 ³	37.06 ¹⁰	37.6 ⁷
35.2	52.73 ²⁷	57.4 ⁰	13.31 ¹⁰	66.1 ⁶	39.14 ⁷⁹	45.3 ³	36.96 ¹⁰	38.2 ⁶
Sec δ , Tan δ	1.854	+1.561	1.008	+0.125	3.966	-3.838	1.000	-0.028
Mean Place	49°.737	18''.74	10°.031	42''.47	34°.854	48''.17	33°.619	58''.84
D ψ a , D ω a	+0.01	-0.10	0.00	-0.01	-0.02	+0.26	0.00	0.00
D ψ δ , D ω δ	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cassiopeiæ. Mag. 2.2		μ Andromedæ. Mag. 3.9		α Sculptoris. Mag. 4.4		ϵ Piscium. Mag. 4.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 0 51 s	° ' + 60 14 "	h m 0 51 s	° ' + 38 1 "	h m 0 54 s	° ' - 29 49 "	h m 0 58 s	° ' + 7 25 "
Jan. 0.3	25.92	63.3	54.74	52.2	25.14	49.6	25.53	21.7
10.2	25.60 32	63.2 1	54.58 16	51.8 4	25.00 14	50.0 4	25.43 10	21.1 6
20.2	25.27 33	62.6 6	54.41 17	51.0 8	24.86 14	50.0 0	25.32 11	20.5 6
30.2	24.95 32	61.4 12	54.25 16	49.9 11	24.73 13	49.6 4	25.21 11	19.8 7
Feb. 9.1	24.66 29 26	59.8 16 19	54.10 15 13	48.5 14 16	24.60 13 11	48.8 8 11	25.11 10 9	19.2 6 5
19.1	24.40	57.9	53.97	46.9	24.49	47.7	25.02	18.7
Mar. 1.1	24.20 20	55.6 23	53.87 10	45.2 17	24.41 8	46.3 14	24.95 7	18.3 4
11.1	24.06 14	53.1 25	53.81 6	43.4 18	24.36 5	44.6 17	24.91 4	18.0 3
21.0	24.00 6	50.6 25	53.80 1	41.7 17	24.34 2	42.6 20	24.90 1	17.9 1
31.0	24.02 2 10	48.0 26 24	53.83 3 9	40.1 16 14	24.36 2 7	40.3 23 25	24.93 3 7	18.0 1 3
Apr. 10.0	24.12	45.6	53.92	38.7	24.43	37.8	25.00	18.3
20.0	24.31 19	43.4 22	54.06 14	37.5 12	24.54 11	35.2 26	25.11 11	18.9 6
29.9	24.58 27	41.6 18	54.25 19	36.7 8	24.70 16	32.4 28	25.27 16	19.8 9
May 9.9	24.92 34	40.1 15	54.50 25	36.2 5	24.90 20	29.6 28	25.47 20	20.9 11
19.9	25.33 41 47	39.1 10 6	54.79 29 33	36.1 1 3	25.14 24 28	26.8 28 28	25.70 23 27	22.2 13 16
29.8	25.80	38.5	55.12	36.4	25.42	24.0	25.97	23.8
June 8.8	26.31 51	38.4 1	55.47 35	37.2 8	25.73 31	21.4 26	26.27 30	25.6 18
18.8	26.84 53	38.9 5	55.84 37	38.3 11	26.06 33	18.9 25	26.58 31	27.5 19
28.8	27.38 54	39.8 9	56.23 39	39.7 14	26.41 35	16.7 22	26.90 32	29.5 20
July 8.7	27.93 55 53	41.2 14 18	56.62 39 37	41.5 18 21	26.76 35 35	14.8 19 16	27.23 33 32	31.5 20 20
18.7	28.46	43.0	56.99	43.6	27.11	13.2	27.55	33.5
28.7	28.97 51	45.2 22	57.35 36	45.9 23	27.44 33	12.0 12	27.86 31	35.5 20
Aug. 7.7	29.44 47	47.8 26	57.68 33	48.3 24	27.75 31	11.3 7	28.15 29	37.4 19
17.6	29.87 43	50.7 29	57.98 30	50.9 26	28.04 29	11.0 3	28.41 26	39.1 17
27.6	30.24 37 32	53.8 31 32	58.25 27 23	53.5 26 27	28.29 25 22	11.1 1 5	28.64 23 20	40.7 16 13
Sept. 6.6	30.56	57.0	58.48	56.2	28.51	11.6	28.84	42.0
16.5	30.82 26	60.3 33	58.67 19	58.8 26	28.68 17	12.5 9	29.01 17	43.1 11
26.5	31.01 19	63.7 34	58.81 14	61.4 26	28.81 13	13.7 12	29.14 13	44.0 9
Oct. 6.5	31.14 13	67.1 34	58.91 10	63.8 24	28.90 9	15.2 15	29.24 10	44.7 7
16.5	31.20 6 0	70.4 33 30	58.98 7 3	66.0 22 20	28.95 5 1	16.9 17 18	29.30 6 3	45.2 5 2
26.4	31.20	73.4	59.01	68.0	28.96	18.7	29.33	45.4
Nov. 5.4	31.15 5	76.2 28	59.00 1	69.8 18	28.93 3	20.5 18	29.34 1	45.4 0
15.4	31.04 11	78.8 26	58.96 4	71.3 15	28.87 6	22.3 18	29.32 2	45.3 1
25.4	30.87 17	81.0 22	58.89 7	72.5 12	28.79 8	24.0 17	29.28 4	45.1 2
Dec. 5.3	30.66 21 25	82.7 17 13	58.79 10 12	73.4 9 5	28.69 10 12	25.5 15 12	29.22 6 8	44.7 4 5
15.3	30.41	84.0	58.67	73.9	28.57	26.7	29.14	44.2
25.3	30.12 29	84.8 8	58.53 14	74.0 1	28.44 13	27.6 9	29.05 9	43.7 5
35.2	29.81 31	85.0 2	58.38 15	73.8 2	28.30 14	28.2 6	28.95 10	43.1 6
Sec δ , Tan δ	2.015	+1.749	1.269	+0.782	1.153	-0.573	1.008	+0.130
Mean Place	26°.840	45''.09	55°.175	39''.55	24°.808	39''.57	25°.585	19''.06
$D'\psi\alpha$, $D_w\alpha$	+0.01	-0.11	0.00	-0.05	0.00	+0.04	0.00	-0.01
$D\psi\delta$, $D_w\delta$	+0.4	+0.2	+0.4	+0.2	+0.4	+0.2	+0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Phoenixis. Mag. 3.4			μ Cassiopeiæ. Mag. 5.3			η Ceti. Mag. 3.6			β Andromedæ. Mag. 2.4		
	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.
	h I	m 2	° — 47 ' 10	h I	m 2	° + 54 ' 29	h I	m 4	° — 10 ' 38	h I	m 4	° + 35 ' 9
	s		"	s		"	s		"	s		"
Jan. 0.3	12.80		79.4	27.69		56.0	12.95		38.7	51.06		46.5
10.2	12.59	21	79.6	27.45	24	55.9	12.84	11	39.3	50.91	15	46.2
20.2	12.37	22	79.2	27.20	25	55.3	12.73	11	39.7	50.75	16	45.5
30.2	12.16	21	78.4	26.95	25	54.3	12.62	11	39.9	50.60	15	44.5
Feb. 9.2	11.97	19	77.1	26.72	23	52.8	12.51	11	39.9	50.45	15	43.2
		16			21			9			13	
19.1	11.81		75.3	26.51		50.9	12.42		39.7	50.32		41.8
Mar. 1.1	11.67	14	73.1	26.34	17	48.8	12.35	7	39.3	50.22	10	40.3
		10			11			5			7	
11.1	11.57		70.6	26.23		46.5	12.30		38.6	50.15		38.7
21.0	11.52	5	67.8	26.18	5	44.1	12.29	1	37.6	50.12	3	37.1
31.0	11.51	1	64.8	26.20	2	41.7	12.31	2	36.4	50.14	2	35.6
		5			9			6			7	
Apr. 10.0	11.56		61.6	26.29		39.5	12.37		35.0	50.21		34.3
20.0	11.66	10	58.3	26.45	16	37.5	12.47	10	33.4	50.33	12	33.3
29.9	11.82	16	54.9	26.69	24	35.8	12.61	14	31.6	50.51	18	32.6
May 9.9	12.03	21	51.5	27.00	31	34.4	12.80	19	29.6	50.74	23	32.2
19.9	12.29	26	48.2	27.36	36	33.4	13.02	22	27.4	51.01	27	32.2
		31			41			26			31	
29.9	12.60		45.1	27.77		32.9	13.28		25.1	51.32		32.5
June 8.8	12.95	35	42.3	28.22	45	32.9	13.57	29	22.8	51.66	34	33.2
		38			48			31			36	
18.8	13.33		39.8	28.70		33.4	13.88		20.6	52.02		34.3
28.8	13.73	40	37.6	29.19	49	34.3	14.20	32	18.4	52.39	37	35.7
July 8.7	14.14	41	35.9	29.69	50	35.6	14.53	33	16.3	52.77	38	37.4
		41			49			32			37	
18.7	14.55		34.6	30.18		37.4	14.85		14.4	53.14		39.4
28.7	14.95	40	33.8	30.65	47	39.5	15.16	31	12.8	53.50	36	41.6
Aug. 7.7	15.33	38	33.5	31.08	43	41.9	15.45	29	11.4	53.83	33	43.9
					40			27			30	
17.6	15.68	35	33.8	31.48		44.5	15.72		10.3	54.13		46.3
27.6	15.99	31	34.6	31.84	36	47.4	15.96	24	9.5	54.40	27	48.8
		26			31			21			24	
Sept. 6.6	16.25		35.8	32.15		50.4	16.17		9.0	54.64		51.3
16.6	16.46	21	37.4	32.41	26	53.5	16.34	17	8.9	54.84	20	53.7
26.5	16.62	16	39.4	32.61	20	56.6	16.47	13	9.1	55.00	16	56.1
Oct. 6.5	16.72	10	41.7	32.76	15	59.7	16.57	10	9.5	55.12	12	58.3
16.5	16.77	5	44.2	32.86	10	62.7	16.64	7	10.2	55.20	8	60.4
		1			5			3			5	
26.4	16.76		46.7	32.91		65.5	16.67		11.1	55.25		62.3
Nov. 5.4	16.71	5	49.2	32.90	1	68.1	16.68	1	12.0	55.26	1	63.9
					5			2			2	
15.4	16.61	10	51.5	32.85		70.4	16.66		13.0	55.24		65.3
25.4	16.47	14	53.6	32.75	10	72.3	16.61	5	14.1	55.18	6	66.4
Dec. 5.3	16.31	16	55.4	32.61	14	73.9	16.55	6	15.1	55.10	8	67.2
		19			18			8			10	
15.3	16.12		56.8	32.43		75.1	16.47		16.1	55.00		67.7
25.3	15.91	21	57.7	32.22	21	75.8	16.37	10	17.0	54.88	12	67.9
35.3	15.70	21	58.2	31.99	23	75.9	16.27	10	17.7	54.74	14	67.7
Sec δ , Tan δ	1.472		—1.079	1.722		+1.402	1.018		—0.188	1.223		+0.704
Mean Place	12 ^h .087		65 ^{''} .20	28 ^h .327		38 ^{''} .75	12 ^h .792		35 ^{''} .20	51 ^h .359		34 ^{''} .34
D ['] α , D _∞ α	—0.01		+0.07	+0.01		—0.09	0.00		+0.01	+0.01		—0.05
D ['] δ , D _∞ δ	+0.4		+0.3	+0.4		+0.3	+0.4		+0.3	+0.4		+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Piscium. Mag. 4.7		ζ Piscium. Mag. 5.6		κ Tucanae. Mag. 5.0		f Piscium. Mag. 5.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 1 6 s	° ' + 29 37 "	h m 1 9 s	° ' + 7 6 "	h m 1 12 s	° ' - 69 19 "	h m 1 13 s	° ' + 3 9 "
Jan. 0.3	51.68	51.4	11.08	59.0	51.12	95.2	18.69	25.3
10.2	51.55 ¹³	51.0 ⁴	10.98 ¹⁰	58.4 ⁶	50.58 ⁵⁴	95.0 ²	18.59 ¹⁰	24.7 ⁶
20.2	51.41 ¹⁴	50.3 ⁷	10.87 ¹¹	57.7 ⁷	50.05 ⁵³	94.2 ⁸	18.48 ¹¹	24.1 ⁶
30.2	51.27 ¹⁴	49.4 ⁹	10.76 ¹¹	57.1 ⁶	49.54 ⁵¹	92.9 ¹³	18.37 ¹¹	23.6 ⁵
Feb. 9.2	51.13 ¹⁴	48.3 ¹¹	10.65 ¹¹	56.6 ⁵	49.07 ⁴⁷	91.0 ¹⁹	18.26 ¹¹	23.1 ⁵
19.1	51.01 ¹²	47.0 ¹³	10.56 ⁹	56.1 ⁵	48.65 ⁴²	88.6 ²⁴	18.17 ⁹	22.8 ³
Mar. 1.1	50.92 ⁹	45.7 ¹³	10.48 ⁸	55.7 ⁴	48.29 ³⁶	85.8 ²⁸	18.09 ⁸	22.6 ²
11.1	50.86 ⁶	44.3 ¹⁴	10.43 ⁵	55.4 ³	48.00 ²⁹	82.6 ³²	18.03 ⁶	22.5 ¹
21.1	50.83 ³	43.0 ¹³	10.41 ²	55.3 ¹	47.80 ²⁰	79.1 ³⁵	18.01 ²	22.6 ¹
31.0	50.85 ²	41.8 ¹²	10.43 ²	55.4 ¹	47.69 ¹¹	75.5 ³⁶	18.03 ²	23.0 ⁴
Apr. 10.0	50.91 ⁶	40.8 ¹⁰	10.49 ⁶	55.8 ⁴	47.67 ²	71.7 ³⁸	18.08 ⁵	23.6 ⁶
20.0	51.03 ¹²	40.1 ⁷	10.59 ¹⁰	56.4 ⁶	47.75 ⁸	67.8 ³⁹	18.18 ¹⁰	24.4 ⁸
29.9	51.20 ¹⁷	39.7 ⁴	10.74 ¹⁵	57.2 ⁸	47.94 ¹⁹	64.0 ³⁸	18.32 ¹⁴	25.5 ¹¹
May 9.9	51.41 ²¹	39.6 ¹	10.93 ¹⁹	58.3 ¹¹	48.23 ²⁹	60.3 ³⁷	18.50 ¹⁸	26.8 ¹³
19.9	51.67 ²⁶	39.8 ²	11.16 ²³	59.6 ¹³	48.61 ³⁸	56.8 ³⁵	18.72 ²²	28.3 ¹⁵
29.9	51.96 ²⁹	40.4 ⁶	11.42 ²⁶	61.2 ¹⁶	49.07 ⁴⁶	53.6 ³²	18.98 ²⁶	30.0 ¹⁷
June 8.8	52.28 ³²	41.3 ⁹	11.70 ²⁸	62.9 ¹⁷	49.61 ⁵⁴	53.6 ²⁸	19.26 ²⁸	31.9 ¹⁹
18.8	52.63 ³⁵	42.5 ¹²	12.01 ³¹	64.8 ¹⁹	50.21 ⁶⁰	50.8 ²⁵	19.56 ³⁰	33.9 ²⁰
28.8	52.99 ³⁶	44.0 ¹⁵	12.33 ³²	66.8 ²⁰	50.85 ⁶⁴	48.3 ²⁰	19.88 ³²	35.9 ²⁰
July 8.8	53.35 ³⁶	45.8 ¹⁸	12.66 ³³	68.8 ²⁰	51.52 ⁶⁷	46.3 ¹⁵	20.20 ³²	37.9 ²⁰
18.7	53.70 ³⁵	47.8 ²⁰	12.99 ³³	70.8 ²⁰	52.21 ⁶⁹	44.8 ⁹	20.52 ³²	39.9 ²⁰
28.7	54.04 ³⁴	50.0 ²²	13.30 ³¹	72.8 ²⁰	52.21 ⁶⁸	43.9 ³	20.52 ³¹	39.9 ¹⁹
Aug. 7.7	54.36 ³²	52.2 ²²	13.59 ²⁹	74.6 ¹⁸	52.89 ⁶⁵	43.6 ³	20.83 ³¹	41.8 ¹⁹
17.6	54.66 ³⁰	54.5 ²³	13.86 ²⁷	76.3 ¹⁷	53.54 ⁶⁰	43.8 ²	21.13 ³⁰	43.6 ¹⁸
27.6	54.92 ²⁶	56.8 ²³	14.10 ²⁴	77.8 ¹⁵	54.14 ⁶⁰	44.6 ⁸	21.40 ²⁷	45.2 ¹⁶
Sept. 6.6	55.15 ²³	59.1 ²³	14.31 ²¹	79.1 ¹³	54.68 ⁵⁴	46.0 ¹⁴	21.64 ²⁴	46.5 ¹³
16.6	55.34 ¹⁹	61.3 ²²	14.49 ¹⁸	80.2 ¹¹	55.14 ⁴⁶	47.9 ¹⁹	21.85 ²¹	47.6 ¹¹
26.5	55.49 ¹⁵	63.4 ²¹	14.63 ¹⁴	81.1 ⁹	55.14 ³⁷	50.2 ²³	21.85 ¹⁸	47.6 ⁹
Oct. 6.5	55.61 ¹²	65.3 ¹⁹	14.74 ¹¹	81.7 ⁶	55.51 ²⁶	52.8 ²⁶	22.03 ¹⁵	48.5 ⁶
16.5	55.69 ⁸	67.1 ¹⁸	14.81 ⁷	82.1 ⁴	55.77 ¹⁵	52.8 ²⁹	22.18 ¹¹	49.1 ⁴
26.5	55.74 ⁵	68.7 ¹⁶	14.86 ⁵	82.3 ²	55.92 ⁵	55.7 ³⁰	22.29 ⁸	49.5 ²
Nov. 5.4	55.76 ²	70.0 ¹³	14.88 ²	82.3 ⁰	55.97 ⁷	58.7 ³¹	22.37 ⁵	49.7 ⁰
15.4	55.74 ²	71.1 ¹¹	14.87 ¹	82.3 ¹	55.90 ¹⁷	61.8 ²⁹	22.42 ²	49.7 ²
25.4	55.70 ⁴	71.9 ⁸	14.84 ³	82.2 ¹	55.73 ²⁷	64.7 ²⁶	22.44 ¹	49.5 ⁴
Dec. 5.3	55.63 ⁷	72.5 ⁶	14.78 ⁶	81.9 ³	55.46 ³⁵	67.3 ²³	22.43 ³	49.1 ⁵
15.3	55.54 ⁹	72.8 ³	14.71 ⁷	81.6 ⁵	55.11 ⁴²	69.6 ¹⁹	22.40 ⁵	48.6 ⁵
25.3	55.43 ¹¹	72.8 ⁰	14.63 ⁸	81.1 ⁶	54.69 ⁴⁸	71.5 ¹⁴	22.35 ⁷	48.1 ⁶
35.3	55.30 ¹³	72.6 ²	14.53 ¹⁰	80.5 ⁶	54.21 ⁵²	72.9 ⁸	22.28 ⁹	47.5 ⁷
					53.69 ⁵³	73.7 ³	22.19 ¹⁰	46.8 ⁶
					53.16	74.0	22.09	46.2
Sec δ , Tan δ	1.150	+0.569	1.008	+0.125	2.834	-2.652	1.001	+0.055
Mean Place	51 ^h .902	40 ^m ''88	11 ^h .070	56 ^m ''03	49 ^h .151	77 ^m ''78	18 ^h .618	23 ^m ''65
D ψ a , D ω a	0.00	-0.04	0.00	-0.01	-0.02	+0.18	0.00	0.00
D ψ δ , D ω δ	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♊ Piscium. Mag. 4.7		♉ Ceti. Mag. 3.8		♌ Cassiopeiæ. Mag. 2.8		♋ Phœnicis. Mag. 3.4	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m I 14	° ' +26 48	h m I 19	° ' − 8 37	h m I 20	° ' +59 46	h m I 24	° ' −43 45
		"		"		"		"
Jan. 0.3	40.72	35.3	40.68	57.4	6.30	79.9	36.09	62.6
10.3	40.59 ¹³	34.9 ⁴	40.57 ¹¹	58.0 ⁶	5.99 ³¹	80.2 ³	35.89 ²⁰	63.0 ⁴
20.2	40.46 ¹³	34.3 ⁶	40.46 ¹¹	58.5 ⁵	5.67 ³²	79.9 ³	35.68 ²¹	62.9 ¹
30.2	40.32 ¹⁴	33.4 ⁹	40.34 ¹²	58.8 ³	5.35 ³²	79.1 ⁸	35.48 ²⁰	62.4 ⁵
Feb. 9.2	40.19 ¹³	32.4 ¹⁰	40.23 ¹¹	58.9 ¹	5.04 ³¹	77.8 ¹³	35.29 ¹⁹	61.4 ¹⁰
		¹² 11		¹⁰ 1		²⁸ 16		¹⁸ 14
19.1	40.07	31.3	40.13	58.8	4.76	76.2	35.11	60.0
Mar. 1.1	39.98 ⁹	30.1 ¹²	40.04 ⁹	58.5 ³	4.53 ²³	74.2 ²⁰	34.96 ¹⁵	58.1 ¹⁹
11.1	39.91 ⁷	28.9 ¹²	39.98 ⁶	57.9 ⁶	4.35 ¹⁸	71.9 ²³	34.84 ¹²	55.9 ²²
21.1	39.88 ³	27.7 ¹²	39.95 ³	57.1 ⁸	4.24 ¹¹	69.5 ²⁴	34.76 ⁸	53.3 ²⁶
31.0	39.89 ¹	26.7 ¹⁰	39.96 ¹	56.1 ¹⁰	4.21 ³	67.0 ²⁵	34.72 ⁴	50.5 ²⁸
		⁵ 8		⁴ 13		²⁴ 24		² 30
Apr. 10.0	39.94	25.9	40.00	54.8	4.26	64.6	34.74	47.5
20.0	40.05 ¹¹	25.3 ⁶	40.09 ⁹	53.3 ¹⁵	4.40 ¹⁴	62.4 ²²	34.81 ⁷	44.3 ³²
30.0	40.21 ¹⁶	25.0 ³	40.22 ¹³	51.6 ¹⁷	4.62 ²²	60.4 ²⁰	34.93 ¹²	41.0 ³³
May 9.9	40.41 ²⁰	25.0 ⁰	40.39 ¹⁷	49.7 ¹⁹	4.92 ³⁰	58.7 ¹⁷	35.11 ¹⁸	37.7 ³³
19.9	40.66 ²⁵	25.3 ³	40.60 ²¹	47.6 ²¹	5.29 ³⁷	57.4 ¹³	35.34 ²³	34.4 ³³
		²⁸ 6		²⁵ 22		⁴³ 8		²⁷ 32
29.9	40.94	25.9	40.85	45.4	5.72	56.6	35.61	31.2
June 8.8	41.25 ³¹	26.9 ¹⁰	41.12 ²⁷	43.2 ²²	6.20 ⁴⁸	56.2 ⁴	35.92 ³¹	28.3 ²⁹
18.8	41.58 ³³	28.2 ¹³	41.42 ³⁰	41.0 ²²	6.72 ⁵²	56.3 ¹	36.27 ³⁵	25.6 ²⁷
28.8	41.93 ³⁵	29.7 ¹⁵	41.74 ³²	38.8 ²²	7.26 ⁵⁴	56.9 ⁶	36.64 ³⁷	23.2 ²⁴
July 8.8	42.29 ³⁶	31.5 ¹⁸	42.06 ³²	36.7 ²¹	7.81 ⁵⁵	58.0 ¹¹	37.03 ³⁹	21.2 ²⁰
		³⁵ 20		³² 19		⁵⁵ 15		³⁹ 15
18.7	42.64	33.5	42.38	34.8	8.36	59.5	37.42	19.7
28.7	42.97 ³³	35.6 ²¹	42.69 ³¹	33.1 ¹⁷	8.89 ⁵³	61.4 ¹⁹	37.81 ³⁹	18.6 ¹¹
Aug. 7.7	43.29 ³²	37.7 ²¹	42.99 ³⁰	31.6 ¹⁵	9.39 ⁵⁰	63.6 ²²	38.18 ³⁷	18.0 ⁶
17.7	43.59 ³⁰	39.9 ²²	43.27 ²⁸	30.4 ¹²	9.85 ⁴⁶	66.2 ²⁶	38.53 ³⁵	18.0 ⁰
27.6	43.85 ²⁶	42.1 ²²	43.52 ²⁵	29.5 ⁹	10.27 ⁴²	69.0 ²⁸	38.84 ³¹	18.5 ⁵
		²³ 22		²¹ 6		³⁰ 30		²⁷ 10
Sept. 6.6	44.08	44.3	43.73	28.9	10.64	72.0	39.11	19.5
16.6	44.28 ²⁰	46.3 ²⁰	43.92 ¹⁹	28.7 ²	10.95 ³¹	75.2 ³²	39.34 ²³	20.9 ¹⁴
26.5	44.44 ¹⁶	48.2 ¹⁹	44.07 ¹⁵	28.8 ¹	11.20 ²⁵	78.4 ³²	39.52 ¹⁸	22.7 ¹⁸
Oct. 6.5	44.56 ¹²	50.0 ¹⁸	44.18 ¹¹	29.1 ³	11.39 ¹⁹	81.7 ³³	39.65 ¹³	24.8 ²¹
16.5	44.65 ⁹	51.6 ¹⁶	44.26 ⁸	29.6 ⁵	11.52 ¹³	84.9 ³²	39.73 ⁸	27.1 ²³
		⁶ 14		⁵ 8		⁷ 30		³ 25
26.5	44.71	53.0	44.31	30.4	11.59	87.9	39.76	29.6
Nov. 5.4	44.73 ²	54.2 ¹²	44.33 ²	31.3 ⁹	11.60 ¹	90.8 ²⁹	39.74 ²	32.1 ²⁵
15.4	44.72 ¹	55.1 ⁹	44.33 ⁰	32.3 ¹⁰	11.55 ⁵	93.5 ²⁷	39.68 ⁶	34.5 ²⁴
25.4	44.69 ³	55.8 ⁷	44.30 ³	33.4 ¹¹	11.44 ¹¹	95.8 ²³	39.58 ¹⁰	36.7 ²²
Dec. 5.4	44.63 ⁶	56.3 ⁵	44.24 ⁶	34.4 ¹⁰	11.28 ¹⁶	97.8 ²⁰	39.45 ¹³	38.7 ²⁰
		⁸ 2		⁷ 9		²¹ 15		¹⁶ 16
15.3	44.55 ¹⁰	56.5 ⁰	44.17 ⁹	35.3 ⁹	11.07 ²⁵	99.3 ¹¹	39.29 ¹⁸	40.3 ¹²
25.3	44.45 ¹¹	56.5 ³	44.08 ¹¹	36.2 ⁸	10.82 ²⁹	100.4 ⁶	39.11 ²⁰	41.5 ⁷
35.3	44.34	56.2	43.97	37.0	10.53	101.0	38.91	42.2
Sec δ, Tan δ	1.120	+0.505	1.012	−0.152	1.987	+1.717	1.385	−0.958
Mean Place	40°.856	25'' .45	40°.453	55'' .19	6°.841	61'' .10	35°.284	50'' .10
D'ψ a, Dω a	0.00	−0.03	0.00	+0.01	+0.02	−0.11	−0.01	+0.06
Dψ δ, Dω δ	+0.4	+0.3	+0.4	+0.3	+0.4	+0.3	+0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	38 Cassiopeiæ. Mag. 6.0		η Piscium. Mag. 3.7		40 Cassiopeiæ. Mag. 5.5		υ Andromedæ. Mag. 4.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m I 24	° ' " +69 48	h m I 26	° ' " +14 53	h m I 31	° ' " +72 35	h m I 31	° ' " +40 58
Jan. 0.3	43.38	83.1	49.56	57.8	31.62	71.0	40.96	29.1
10.3	42.88 50	83.6 5	49.45 11	57.3 5	31.04 58	71.7 7	40.79 17	29.1 0
20.2	42.37 51	83.6 0	49.33 12	56.7 6	30.43 61	71.8 1	40.61 18	28.7 4
30.2	41.85 52	83.0 6	49.21 12	56.0 7	29.81 62	71.3 5	40.43 18	27.9 8
Feb. 9.2	41.35 50	81.9 11	49.09 12	55.3 7	29.21 60	70.3 10	40.25 18	26.8 11
	45	17	11	7	55	16	17	13
19.1	40.90	80.2	48.98	54.6	28.66	68.7	40.08	25.5
Mar. 1.1	40.51 39	78.1 21	48.89 9	53.9 7	28.19 47	66.7 20	39.94 14	23.9 16
11.1	40.21 30	75.7 24	48.82 7	53.3 6	27.82 37	64.3 24	39.83 11	22.2 17
21.1	40.01 20	73.1 26	48.79 3	52.8 5	27.56 26	61.7 26	39.76 7	20.5 17
31.0	39.92 9	70.4 27	48.79 0	52.4 4	27.43 13	58.9 28	39.74 2	18.8 17
	3	27	4	2	1	28	4	16
Apr. 10.0	39.95	67.7	48.83	52.2	27.44	56.1	39.78	17.2
20.0	40.11 16	65.1 26	48.92 9	52.3 1	27.58 14	53.4 27	39.88 10	15.8 14
30.0	40.39 28	62.7 24	49.05 13	52.7 4	27.87 29	50.9 25	40.04 16	14.6 12
May 9.9	40.78 39	60.6 21	49.23 18	53.4 7	28.29 42	48.7 22	40.25 21	13.7 9
19.9	41.27 49	58.9 17	49.45 22	54.3 9	28.83 54	46.9 18	40.51 26	13.2 5
	58	13	26	11	64	14	31	1
29.9	41.85	57.6	49.71	55.4	29.47	45.5	40.82	13.1
June 8.8	42.50 65	56.8 8	50.00 29	56.8 14	30.19 72	44.5 10	41.16 34	13.4 3
18.8	43.20 70	56.5 3	50.31 31	58.4 16	30.98 79	44.1 4	41.53 37	14.0 6
28.8	43.94 74	56.8 3	50.63 32	60.2 18	31.81 83	44.2 1	41.92 39	15.0 10
July 8.8	44.69 75	57.6 8	50.96 33	62.0 18	32.66 85	44.8 6	42.32 40	16.4 14
	75	12	33	19	85	11	40	16
18.7	45.44	58.8	51.29	63.9	33.51	45.9	42.72	18.0
28.7	46.17 73	60.5 17	51.61 32	65.9 20	34.34 83	47.4 15	43.11 39	19.9 19
Aug. 7.7	46.86 69	62.7 22	51.92 31	67.9 20	35.14 80	49.4 20	43.48 37	22.1 22
17.7	47.50 64	65.2 25	52.20 28	69.8 19	35.88 74	51.8 24	43.82 34	24.4 23
27.6	48.08 58	68.0 28	52.46 26	71.5 17	36.56 68	54.6 28	44.14 32	26.8 24
	51	31	23	16	60	31	28	25
Sept. 6.6	48.59	71.1	52.69	73.1	37.16	57.7	44.42	29.3
16.6	49.03 44	74.4 33	52.89 20	74.5 14	37.67 51	61.0 33	44.66 24	31.8 25
26.5	49.39 36	77.8 34	53.05 16	75.8 13	38.09 42	64.4 34	44.86 20	34.3 25
Oct. 6.5	49.66 27	81.3 35	53.18 13	76.9 11	38.41 32	67.9 35	45.03 17	36.8 25
16.5	49.83 17	84.8 35	53.28 10	77.8 9	38.63 22	71.5 36	45.15 12	39.1 23
	8	35	7	5	11	35	8	22
26.5	49.91	88.3	53.35	78.4	38.74	75.0	45.23	41.3
Nov. 5.4	49.90 1	91.6 33	53.38 3	78.9 5	38.74 0	78.4 34	45.27 4	43.3 20
15.4	49.80 10	94.6 30	53.39 1	79.2 3	38.63 11	81.6 32	45.27 0	45.0 17
25.4	49.61 19	97.4 28	53.37 2	79.3 1	38.42 21	84.5 29	45.24 3	46.5 15
Dec. 5.4	49.34 27	99.8 24	53.33 4	79.3 0	38.11 31	87.1 26	45.18 6	47.7 12
	35	20	6	2	40	21	10	9
15.3	48.99	101.8	53.27	79.1	37.71	89.2	45.08	48.6
25.3	48.58 41	103.2 14	53.19 8	78.8 3	37.23 48	90.8 16	44.95 13	49.1 5
35.3	48.11 47	104.1 9	53.09 10	78.3 5	36.69 54	91.8 10	44.80 15	49.3 2
Sec δ, Tan δ	2.900	+2.722	1.035	+0.266	3.344	+3.191	1.324	+0.868
Mean Place	44°.152	62''.48	49°.512	51''.59	32°.375	49''.85	41°.107	14''.55
D'ψ a, Dω a	+0.03	-0.18	0.00	-0.02	+0.03	-0.20	+0.01	-0.06
Dψ δ, Dω δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Piscium. Mag. 5.6		υ Persei. Mag. 3.8		α Eridani. Mag. 0.6		ω Cassiopeiae. Mag. 5.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	<div>h m 1 32</div>	<div>° ' +11 41</div>	<div>h m 1 32</div>	<div>° ' +48 11</div>	<div>h m 1 34</div>	<div>° ' -57 40</div>	<div>h m 1 35</div>	<div>° ' +67 36</div>
	<div>s s</div>	<div>" "</div>	<div>s s</div>	<div>" "</div>	<div>s s</div>	<div>" "</div>	<div>s s</div>	<div>" "</div>
Jan. 0.3	29.16	53.8	38.47	32.6	29.88	57.7	52.30	33.1
10.3	29.05 ¹¹	53.3 ⁵	38.27 ²⁰	32.7 ¹	29.56 ³²	58.0 ³	51.87 ⁴³	33.7 ⁶
20.2	28.94 ¹¹	52.7 ⁶	38.05 ²²	32.4 ³	29.24 ³²	57.8 ²	51.42 ⁴⁵	33.8 ¹
30.2	28.82 ¹²	52.1 ⁶	37.83 ²²	31.6 ⁸	28.92 ³²	57.0 ⁸	50.96 ⁴⁶	33.3 ⁵
Feb. 9.2	28.70 ¹²	51.4 ⁷	37.61 ²²	30.5 ¹¹	28.61 ³¹	55.7 ¹³	50.51 ⁴⁵	32.2 ¹¹
	¹¹	⁶	²⁰	¹⁴	²⁸	¹⁸	⁴²	¹⁵
19.2	28.59	50.8	37.41	29.1	28.33	53.9	50.09	30.7
Mar. 1.1	28.49 ¹⁰	50.3 ⁵	37.24 ¹⁷	27.4 ¹⁷	28.08 ²⁵	51.7 ²²	49.73 ³⁶	28.8 ¹⁹
11.1	28.42 ⁷	49.8 ⁵	37.11 ¹³	25.5 ¹⁹	27.88 ²⁰	49.0 ²⁷	49.44 ²⁹	26.5 ²³
21.1	28.38 ⁴	49.4 ⁴	37.03 ⁸	23.4 ²¹	27.73 ¹⁵	46.0 ³⁰	49.24 ²⁰	23.9 ²⁶
31.0	28.37 ¹	49.3 ¹	37.00 ³	21.4 ²⁰	27.64 ⁹	42.7 ³³	49.14 ¹⁰	21.3 ²⁶
	⁴	¹	³	¹⁹	³	³⁵	¹	²⁶
Apr. 10.0	28.41	49.4	37.03	19.5	27.61	39.2	49.15	18.7
20.0	28.49 ⁸	49.7 ³	37.13 ¹⁰	17.7 ¹⁸	27.65 ⁴	35.6 ³⁶	49.28 ¹³	16.1 ²⁶
30.0	28.62 ¹³	50.2 ⁵	37.30 ¹⁷	16.2 ¹⁵	27.76 ¹¹	31.9 ³⁷	49.51 ²³	13.7 ²⁴
May 9.9	28.79 ¹⁷	51.0 ⁸	37.53 ²³	15.0 ¹²	27.94 ¹⁸	28.3 ³⁶	49.85 ³⁴	11.7 ²⁰
19.9	29.00 ²¹	52.0 ¹⁰	37.82 ²⁹	14.2 ⁸	28.18 ²⁴	24.8 ³⁵	50.28 ⁴³	10.0 ¹⁷
	²⁵	¹³	³⁴	⁵	³¹	³⁴	⁵²	¹³
29.9	29.25	53.3	38.16	13.7	28.49	21.4	50.80	8.7
June 8.9	29.53 ²⁸	54.8 ¹⁵	38.54 ³⁸	13.6 ¹	28.86 ³⁷	18.3 ³¹	51.39 ⁵⁹	7.9 ⁸
18.8	29.83 ³⁰	56.5 ¹⁷	38.95 ⁴¹	14.0 ⁴	29.27 ⁴¹	15.5 ²⁸	52.03 ⁶⁴	7.5 ⁴
28.8	30.15 ³²	58.3 ¹⁸	39.38 ⁴³	14.8 ⁸	29.72 ⁴⁵	13.1 ²⁴	52.70 ⁶⁷	7.7 ²
July 8.8	30.48 ³³	60.2 ¹⁹	39.82 ⁴⁴	16.0 ¹²	30.19 ⁴⁷	11.2 ¹⁹	53.39 ⁶⁹	8.4 ⁷
	³³	¹⁹	⁴³	¹⁵	⁴⁸	¹⁴	⁶⁹	¹¹
18.7	30.81	62.1	40.25	17.5	30.67	9.8	54.08	9.5
28.7	31.13 ³²	64.0 ¹⁹	40.68 ⁴³	19.4 ¹⁹	31.16 ⁴⁹	9.0 ⁸	54.76 ⁶⁸	11.1 ¹⁶
Aug. 7.7	31.43 ³⁰	65.9 ¹⁹	41.09 ⁴¹	21.5 ²¹	31.63 ⁴⁷	8.7 ³	55.41 ⁶⁵	13.1 ²⁰
17.7	31.72 ²⁹	67.7 ¹⁸	41.47 ³⁸	23.9 ²⁴	32.07 ⁴⁴	9.0 ³	56.02 ⁶¹	15.5 ²⁴
27.6	31.98 ²⁶	69.3 ¹⁶	41.82 ³⁵	26.5 ²⁶	32.47 ⁴⁰	9.8 ⁸	56.58 ⁵⁶	18.2 ²⁷
	²³	¹⁵	³¹	²⁷	³⁵	¹⁴	⁴⁹	³⁰
Sept. 6.6	32.21	70.8	42.13	29.2	32.82	11.2	57.07	21.2
16.6	32.41 ²⁰	72.1 ¹³	42.40 ²⁷	31.9 ²⁷	33.12 ³⁰	13.0 ¹⁸	57.50 ⁴³	24.4 ³²
26.6	32.58 ¹⁷	73.2 ¹¹	42.62 ²²	34.7 ²⁸	33.35 ²³	15.3 ²³	57.85 ³⁵	27.7 ³³
Oct. 6.5	32.71 ¹³	74.1 ⁹	42.80 ¹⁸	37.4 ²⁷	33.51 ¹⁶	17.9 ²⁶	58.13 ²⁸	31.1 ³⁴
16.5	32.81 ¹⁰	74.7 ⁶	42.93 ¹³	40.1 ²⁷	33.61 ¹⁰	20.7 ²⁸	58.33 ²⁰	34.5 ³⁴
	⁷	⁴	⁹	²⁶	²	²⁸	¹¹	³⁴
26.5	32.88	75.1	43.02	42.7	33.63	23.5	58.44	37.9
Nov. 5.4	32.92 ⁴	75.4 ³	43.06 ⁴	45.1 ²⁴	33.58 ⁵	26.4 ²⁹	58.47 ³	41.1 ³²
15.4	32.94 ²	75.5 ¹	43.06 ⁰	47.2 ²¹	33.47 ¹¹	29.2 ²⁸	58.42 ⁵	44.1 ³⁰
25.4	32.93 ¹	75.5 ⁰	43.02 ⁴	49.1 ¹⁹	33.31 ¹⁶	31.7 ²⁵	58.29 ¹³	46.9 ²⁸
Dec. 5.4	32.89 ⁴	75.3 ²	42.94 ⁸	50.6 ¹⁵	33.09 ²²	33.9 ²²	58.08 ²¹	49.3 ²⁴
	⁶	³	¹²	¹²	²⁶	¹⁷	²⁸	¹⁹
15.3	32.83	75.0	42.82	51.8	32.83	35.6	57.80	51.2
25.3	32.75 ⁸	74.6 ⁴	42.66 ¹⁶	52.6 ⁸	32.54 ²⁹	36.8 ¹²	57.45 ³⁵	52.7 ¹⁵
35.3	32.65 ¹⁰	74.1 ⁵	42.48 ¹⁸	53.0 ⁴	32.23 ³¹	37.5 ⁷	57.05 ⁴⁰	53.7 ¹⁰
Sec δ , Tan δ	1.021	+0.207	1.500	+1.118	1.870	-1.581	2.625	+2.427
Mean Place	29°.044	48''.48	38°.686	16''.04	28°.506	42''.96	52°.804	12''.57
D' δ , D _m α	0.00	-0.01	+0.01	-0.07	-0.02	+0.10	+0.03	-0.15
D ₁ δ , D _m δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Piscium. Mag. 4.7		♑ Persei. Mag. 4.2		♊ Ceti. Mag. 3.6		♐ Piscium. Mag. 4.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N
	h m 1 36 s	° ' + 5 2 "	h m 1 38 s	° ' + 50 15 "	h m 1 40 s	° ' - 16 23 "	h m 1 40 s	° ' + 8 "
Jan. 0.3	54.33	55.0	11.80	20.4	1.98	46.9	48.04	17.3
10.3	54.23 ¹⁰	54.4 ⁶	11.59 ²¹	20.6 ²	1.86 ¹²	47.6 ⁷	47.94 ¹⁰	16.7
20.2	54.12 ¹¹	53.8 ⁶	11.36 ²³	20.4 ²	1.73 ¹³	48.0 ⁴	47.83 ¹¹	16.2
30.2	54.00 ¹²	53.3 ⁵	11.12 ²⁴	19.7 ⁷	1.60 ¹³	48.2 ²	47.71 ¹²	15.6
Feb. 9.2	53.89 ¹¹	52.8 ⁵	10.89 ²³	18.6 ¹¹	1.47 ¹³	48.2 ⁰	47.59 ¹²	15.0
	¹¹	⁴	²¹	¹⁴	¹²	⁴	¹²	
19.2	53.78	52.4	10.68	17.2	1.35	47.8	47.47	14.5
Mar. 1.1	53.68 ¹⁰	52.1 ³	10.49 ¹⁹	15.5 ¹⁷	1.24 ¹¹	47.1 ⁷	47.37 ¹⁰	14.1
11.1	53.61 ⁷	52.0 ¹	10.34 ¹⁵	13.6 ¹⁹	1.15 ⁹	46.2 ⁹	47.30 ⁷	13.8
21.1	53.57 ⁴	52.0 ⁰	10.24 ¹⁰	11.6 ²⁰	1.09 ⁶	45.0 ¹²	47.25 ⁵	13.6
31.0	53.56 ¹	52.2 ²	10.20 ⁴	9.5 ²¹	1.06 ³	43.5 ¹⁵	47.24 ¹	13.6
	³	⁵	³	²⁰	²	¹⁷	³	
Apr. 10.0	53.59	52.7	10.23	7.5	1.08	41.8	47.27	13.9
20.0	53.66 ⁷	53.4 ⁷	10.33 ¹⁰	5.6 ¹⁹	1.14 ⁶	39.9 ¹⁹	47.34 ⁷	14.3
30.0	53.78 ¹²	54.3 ⁹	10.49 ¹⁶	4.0 ¹⁶	1.24 ¹⁰	37.7 ²²	47.46 ¹²	15.0
May 9.9	53.94 ¹⁶	55.4 ¹¹	10.72 ²³	2.6 ¹⁴	1.39 ¹⁵	35.4 ²³	47.62 ¹⁶	15.9
19.9	54.14 ²⁰	56.8 ¹⁴	11.01 ²⁹	1.6 ¹⁰	1.58 ¹⁹	33.0 ²⁴	47.82 ²⁰	17.1
	²⁴	¹⁶	³⁴	⁶	²³	²⁵	²⁴	
29.9	54.38	58.4	11.35	1.0	1.81	30.5	48.06	18.5
June 8.9	54.65 ²⁷	60.1 ¹⁷	11.74 ³⁹	0.8 ²	2.07 ²⁶	28.0 ²⁵	48.33 ²⁷	20.1
18.8	54.95 ³⁰	62.0 ¹⁹	12.16 ⁴²	1.1 ³	2.36 ²⁹	25.6 ²⁴	48.63 ³⁰	21.9
28.8	55.26 ³¹	63.9 ¹⁹	12.60 ⁴⁴	1.8 ⁷	2.67 ³¹	23.2 ²⁴	48.94 ³¹	23.7
July 8.8	55.58 ³²	65.9 ²⁰	13.06 ⁴⁶	2.9 ¹¹	2.99 ³²	21.0 ²²	49.26 ³²	25.6
	³²	¹⁹	⁴⁵	¹⁴	³²	²⁰	³³	
18.7	55.90	67.8	13.51	4.3	3.31	19.0	49.59	27.5
28.7	56.22 ³²	69.7 ¹⁹	13.95 ⁴⁴	6.1 ¹⁸	3.63 ³²	17.3 ¹⁷	49.91 ³²	29.4
Aug. 7.7	56.52 ³⁰	71.5 ¹⁸	14.38 ⁴³	8.2 ²¹	3.93 ³⁰	16.0 ¹³	50.22 ³¹	31.2
17.7	56.80 ²⁸	73.1 ¹⁶	14.78 ⁴⁰	10.5 ²³	4.22 ²⁹	15.0 ¹⁰	50.51 ²⁹	32.9
27.6	57.06 ²⁶	74.5 ¹⁴	15.15 ³⁷	13.0 ²⁵	4.48 ²⁶	14.3 ⁷	50.77 ²⁶	34.4
	²³	¹²	³³	²⁷	²³	³	²³	
Sept. 6.6	57.29	75.7	15.48	15.7	4.71	14.0	51.00	35.8
16.6	57.49 ²⁰	76.6 ⁹	15.76 ²⁸	18.5 ²⁸	4.91 ²⁰	14.1 ¹	51.21 ²¹	36.9
26.6	57.66 ¹⁷	77.3 ⁷	16.00 ²⁴	21.3 ²⁸	5.08 ¹⁷	14.5 ⁴	51.38 ¹⁷	37.8
Oct. 6.5	57.80 ¹⁴	77.8 ⁵	16.19 ¹⁹	24.1 ²⁸	5.21 ¹³	15.3 ⁸	51.52 ¹⁴	38.5
16.5	57.90 ¹⁰	78.1 ³	16.34 ¹⁵	26.9 ²⁸	5.31 ¹⁰	16.3 ¹⁰	51.63 ¹¹	38.9
	⁷	⁰	¹⁰	²⁷	⁷	¹²	⁸	
26.5	57.97	78.1	16.44	29.6	5.38	17.5	51.71	39.2
Nov. 5.4	58.01 ⁴	78.0 ¹	16.49 ⁵	32.1 ²⁵	5.41 ³	18.8 ¹³	51.76 ⁵	39.3
15.4	58.03 ²	77.7 ³	16.49 ⁰	34.3 ²²	5.41 ⁰	20.2 ¹⁴	51.78 ²	39.2
25.4	58.02 ¹	77.3 ⁴	16.45 ⁴	36.3 ²⁰	5.38 ³	21.6 ¹⁴	51.78 ⁰	39.0
Dec. 5.4	57.99 ³	76.8 ⁵	16.37 ⁸	38.0 ¹⁷	5.33 ⁵	23.0 ¹⁴	51.75 ³	38.7
	⁵	⁶	¹³	¹³	⁷	¹²	⁶	
15.3	57.94 ⁸	76.2 ⁵	16.24 ¹⁶	39.3 ⁹	5.26 ¹⁰	24.2 ¹¹	51.69 ⁷	38.3
25.3	57.86 ⁹	75.7 ⁶	16.08 ¹⁹	40.2 ⁵	5.16 ¹¹	25.3 ⁹	51.62 ⁹	37.8
35.3	57.77	75.1	15.89	40.7	5.05	26.2	51.53	37.2
Sec δ, Tan δ	1.004	+0.088	1.564	+1.202	1.042	-0.294	1.012	+0.1
Mean Place	54 ^s .138	51 ^{''} .83	11 ^s .986	3 ^{''} .25	1 ^s .548	42 ^{''} .92	47 ^s .856	12 ^{''} .7
D'ψ a, Dω a	0.00	-0.01	+0.01	-0.07	0.00	+0.02	0.00	-0.0
Dψ δ, Dω δ	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4	+0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Sculptoris. Mag. 5.4		ζ Ceti. Mag. 3.9		α Trianguli. Mag. 3.6		ε Cassiopeiæ. Mag. 3.4	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m I 41 s	° ' " -25 28 "	h m I 47 s	° ' " -10 45 "	h m I 48 s	° ' " +29 9 "	h m I 48 s	° ' " +63 14 "
Jan. 0.3	34.64	79.7 8	10.35	53.7 7	7.16	31.1 2	7.12	51.8 7
10.3	34.50 ¹⁴	80.5 8	10.24 ¹¹	54.4 7	7.04 ¹²	30.9 2	6.78 ³⁴	52.5 7
20.2	34.36 ¹⁴	80.9 4	10.12 ¹²	55.0 6	6.90 ¹⁴	30.5 4	6.42 ³⁶	52.6 1
30.2	34.21 ¹⁵	80.9 0	10.00 ¹²	55.4 4	6.75 ¹⁵	29.8 7	6.04 ³⁸	52.2 4
Feb. 9.2	34.07 ¹⁴	80.6 3	9.87 ¹³	55.5 1	6.60 ¹⁵	29.0 8	5.67 ³⁷	51.3 9
	¹³	6	¹²	1	¹⁴	10	³⁵	14
19.2	33.94	80.0	9.75	55.4	6.46	28.0	5.32	49.9
Mar. 1.1	33.82 ¹²	79.0 ¹⁰	9.64 ¹¹	55.0 4	6.34 ¹²	26.9 ¹¹	5.01 ³¹	48.1 ¹⁸
	¹⁰	13	8	6	¹⁰	12	²⁵	21
11.1	33.72	77.7 ¹³	9.56 ⁶	54.4 6	6.24 ¹⁰	25.7 ¹²	4.76 ¹⁸	46.0 ²³
21.1	33.65 ⁷	76.0 ¹⁷	9.50 ⁶	53.5 9	6.17 ⁷	24.5 ¹²	4.58 ¹⁰	43.7 ²⁵
31.1	33.62 ³	74.1 ¹⁹	9.48 ²	52.4 ¹¹	6.15 ²	23.4 ¹¹	4.48 ¹⁰	41.2 ²⁵
	¹	22	¹	14	²	9	⁰	25
Apr. 10.0	33.63	71.9	9.49	51.0	6.17	22.5	4.48	38.7
20.0	33.69 ⁶	69.5 ²⁴	9.55 ⁶	49.4 ¹⁶	6.24 ⁷	21.7 8	4.57 ⁹	36.3 ²⁴
30.0	33.79 ¹⁰	66.9 ²⁶	9.65 ¹⁰	47.6 ¹⁸	6.37 ¹³	21.2 5	4.75 ¹⁸	34.1 ²²
May 9.9	33.94 ¹⁵	64.2 ²⁷	9.80 ¹⁵	45.6 ²⁰	6.54 ¹⁷	20.9 3	5.03 ²⁸	32.1 ²⁰
19.9	34.14 ²⁰	61.5 ²⁷	9.99 ¹⁹	43.5 ²¹	6.76 ²²	20.9 0	5.39 ³⁶	30.5 ¹⁶
	²³	28	²²	23	²⁶	3	⁴⁴	13
29.9	34.37	58.7	10.21	41.2	7.02	21.2	5.83	29.2
June 8.9	34.64 ²⁷	56.0 ²⁷	10.47 ²⁶	38.9 ²³	7.32 ³⁰	21.9 7	6.33 ⁵⁰	28.4 8
18.8	34.94 ³⁰	53.4 ²⁶	10.76 ²⁹	36.6 ²³	7.65 ³³	22.9 ¹⁰	6.87 ⁵⁴	28.1 3
28.8	35.26 ³²	50.9 ²⁵	11.06 ³⁰	34.4 ²²	8.00 ³⁵	24.1 ¹²	7.45 ⁵⁸	28.2 1
July 8.8	35.59 ³³	48.7 ²²	11.38 ³²	32.2 ²²	8.35 ³⁵	25.5 ¹⁴	8.05 ⁶⁰	28.8 6
	³⁴	19	³²	20	³⁶	17	⁶¹	11
18.8	35.93	46.8	11.70	30.2	8.71	27.2	8.66	29.9
28.7	36.26 ³³	45.3 ¹⁵	12.01 ³¹	28.5 ¹⁷	9.06 ³⁵	29.1 ¹⁹	9.26 ⁶⁰	31.4 ¹⁵
Aug. 7.7	36.58 ³²	44.2 ¹¹	12.32 ³¹	27.0 ¹⁵	9.40 ³⁴	31.1 ²⁰	9.84 ⁵⁸	33.3 ¹⁹
	³⁰	8	²⁹	12	³²	20	⁵⁴	23
17.7	36.88	43.4	12.61	25.8	9.72 ³²	33.1 ²⁰	10.38 ⁵⁴	35.6 ²³
27.6	37.16 ²⁸	43.1 3	12.88 ²⁷	25.0 8	10.02 ³⁰	35.1 ²⁰	10.88 ⁵⁰	38.1 ²⁵
	²⁵	2	²⁴	5	²⁷	21	⁴⁵	28
Sept. 6.6	37.41	43.3	13.12	24.5	10.29	37.2	11.33	40.9
16.6	37.62 ²¹	43.8 5	13.33 ²¹	24.3 2	10.52 ²³	39.2 ²⁰	11.73 ⁴⁰	43.9 ³⁰
26.6	37.79 ¹⁷	44.7 9	13.50 ¹⁷	24.4 1	10.72 ²⁰	41.1 ¹⁹	12.07 ³⁴	47.1 ³²
Oct. 6.5	37.93 ¹⁴	46.0 ¹³	13.64 ¹⁴	24.9 5	10.88 ¹⁶	42.9 ¹⁸	12.34 ²⁷	50.3 ³²
16.5	38 03 ¹⁰	47.5 ¹⁵	13.75 ¹¹	25.6 7	11.01 ¹³	44.5 ¹⁶	12.55 ²¹	53.5 ³²
	⁷	17	⁸	9	¹⁰	15	¹⁴	32
26.5	38.10	49.2	13.83	26.5	11.11	46.0	12.69	56.7
Nov. 5.5	38.13 ³	51.0 ¹⁸	13.88 ⁵	27.6 ¹¹	11.18 ⁷	47.3 ¹³	12.76 ⁷	59.8 ³¹
15.4	38.12 ¹	52.9 ¹⁹	13.89 ¹	28.8 ¹²	11.21 ³	48.4 ¹¹	12.75 ¹	62.7 ²⁹
25.4	38.08 ⁴	54.7 ¹⁸	13.88 ¹	30.0 ¹²	11.21 ⁰	49.3 9	12.68 ⁷	65.3 ²⁶
Dec. 5.4	38.02 ⁶	56.4 ¹⁷	13.84 ⁴	31.2 ¹²	11.18 ³	50.0 7	12.54 ¹⁴	67.6 ²³
	⁸	15	⁶	11	⁶	5	²⁰	19
15.3	37.94	57.9	13.78	32.3	11.12	50.5	12.34	69.5
25.3	37.83 ¹¹	59.1 ¹²	13.70 ⁸	33.3 ¹⁰	11.03 ⁹	50.7 2	12.08 ²⁶	71.0 ¹⁵
35.3	37.70 ¹³	60.0 9	13.60 ¹⁰	34.2 9	10.92 ¹¹	50.6 1	11.77 ³¹	72.0 ¹⁰
Sec δ, Tan δ	1.108	-0.477	1.018	-0.190	1.145	+0.558	2.221	+1.983
Mean Place	34°.072	73''.04	9°.943	51''.88	7°.092	19''.64	7°.349	31''.86
D'ψ α, Dω α	-0.01	+0.03	0.00	+0.01	+0.01	-0.03	+0.02	-0.12
Dψ δ, Dω δ	+0.4	+0.4	+0.4	+0.5	+0.4	+0.5	+0.4	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Piscium. Mag. 4.8		β Arietis. Mag. 2.7		ψ Phœnicis. Mag. 4.4		ν Ceti. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m I 49 s	° ' " + 2 45 "	h m I 49 s	° ' " + 20 22 "	h m I 50 s	° ' " - 46 43 "	h m I 55 s	° ' " - 21 29 "
Jan. 0.3	3.29	33.2	49.97	68.1	10.46	55.3	54.90	61.1
10.3	3.19 10	32.6 6	49.86 11	67.7 4	10.24 22	56.0 7	54.78 12	61.9 8
20.2	3.08 11	32.0 6	49.74 12	67.2 5	10.01 23	56.2 2	54.65 13	62.4 5
30.2	2.96 12	31.5 5	49.61 13	66.6 6	9.78 23	55.9 3	54.51 14	62.7 3
Feb. 9.2	2.84 12	31.1 4	49.48 13	65.9 7	9.55 23	55.1 8	54.36 15	62.6 1
	12	3	13	8	22	13	14	5
19.2	2.72	30.8	49.35	65.1	9.33	53.8	54.22	62.1
Mar. 1.1	2.62 10	30.6 2	49.23 12	64.2 9	9.13 20	52.0 18	54.10 12	61.3 8
	8	0	9	8	16	22	10	11
11.1	2.54 6	30.6 1	49.14 6	63.4 7	8.97 12	49.8 25	54.00 8	60.2 14
21.1	2.48 2	30.7 3	49.08 2	62.7 7	8.85 8	47.3 28	53.92 4	58.8 16
31.1	2.46 2	31.0 6	49.06 2	62.0 5	8.77 3	44.5 31	53.88 0	57.2 19
Apr. 10.0	2.48 6	31.6 8	49.08 7	61.5 2	8.74 3	41.4 33	53.88 4	55.3 22
20.0	2.54 11	32.4 10	49.15 12	61.3 0	8.77 8	38.1 34	53.92 9	53.1 24
30.0	2.65 15	33.4 13	49.27 16	61.3 2	8.85 14	34.7 34	54.01 13	50.7 25
May 9.9	2.80 19	34.7 15	49.43 20	61.5 5	8.99 20	31.3 34	54.14 18	48.2 26
19.9	2.99 23	36.2 16	49.63 25	62.0 8	9.19 25	27.9 33	54.32 22	45.6 26
29.9	3.22 26	37.8 18	49.88 28	62.8 10	9.44 29	24.6 31	54.54 26	43.0 27
June 8.9	3.48 29	39.6 19	50.16 31	63.8 13	9.73 34	21.5 29	54.80 28	40.3 26
18.8	3.77 31	41.5 20	50.47 33	65.1 15	10.07 37	18.6 26	55.08 31	37.7 24
28.8	4.08 32	43.5 20	50.80 34	66.6 16	10.44 39	16.0 22	55.39 32	35.3 23
July 8.8	4.40 32	45.5 19	51.14 34	68.2 18	10.83 40	13.8 17	55.71 33	33.0 20
18.8	4.72 31	47.4 19	51.48 33	70.0 19	11.23 40	12.1 12	56.04 33	31.0 16
28.7	5.03 31	49.3 17	51.81 32	71.9 19	11.63 39	10.9 7	56.37 32	29.4 13
Aug. 7.7	5.34 29	51.0 15	52.13 30	73.8 19	12.02 37	10.2 2	56.69 30	28.1 9
17.7	5.63 26	52.5 13	52.43 28	75.7 18	12.39 34	10.0 3	56.99 28	27.2 5
27.6	5.89 24	53.8 11	52.71 26	77.5 18	12.73 31	10.3 9	57.27 25	26.7 1
Sept. 6.6	6.13 21	54.9 8	52.97 22	79.3 16	13.04 26	11.2 14	57.52 22	26.6 3
16.6	6.34 18	55.7 6	53.19 19	80.9 15	13.30 21	12.6 18	57.74 19	26.9 7
26.6	6.52 15	56.3 3	53.38 16	82.4 13	13.51 17	14.4 22	57.93 15	27.6 10
Oct. 6.5	6.67 11	56.6 1	53.54 13	83.7 11	13.68 11	16.6 25	58.08 12	28.6 13
16.5	6.78 8	56.7 1	53.67 9	84.8 10	13.79 6	19.1 26	58.20 8	29.9 15
26.5	6.86 6	56.6 3	53.76 6	85.8 8	13.85 0	21.7 27	58.28 5	31.4 17
Nov. 5.5	6.92 3	56.3 4	53.82 3	86.6 6	13.85 4	24.4 26	58.33 1	33.1 18
15.4	6.95 0	55.9 6	53.85 1	87.2 4	13.81 8	27.0 25	58.34 2	34.9 17
25.4	6.95 3	55.3 6	53.86 2	87.6 2	13.73 12	29.5 22	58.32 4	36.6 16
Dec. 5.4	6.92 5	54.7 6	53.84 5	87.8 1	13.61 16	31.7 19	58.28 7	38.2 15
15.3	6.87 7	54.1 7	53.79 8	87.9 1	13.45 19	33.6 14	58.21 10	39.7 13
25.3	6.80 9	53.4 7	53.71 10	87.8 2	13.26 21	35.0 10	58.11 11	41.0 10
35.3	6.71 9	52.7 7	53.61 10	87.6 2	13.05 21	36.0 10	58.00 11	42.0 10
Sec δ , Tan δ	1.001	+0.048	1.067	+0.372	1.459	-1.062	1.075	-0.394
Mean Place	3°.008	30''.41	49°.824	59''.35	9°.387	43''.53	54°.315	56''.22
D' ψ a , D ω a	0.00	0.00	0.00	-0.02	-0.01	+0.06	-0.01	+0.02
D ψ δ , D ω δ	+0.4	+0.5	+0.4	+0.5	+0.4	+0.5	+0.3	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	50 Cassiopeiæ. Mag. 4.1		α Hydri. Mag. 3.0		γ Andromedæ pr. Mag. 2.3		α Arietis. Mag. 2.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m I 55	° ' +71 59	h m I 56	° ' −61 58	h m I 58	° ' +41 54	h m 2 2	° ' +23 3
	s	"	s	"	s	"	s	"
Jan. 0.3	58.56	84.7	3.17	108.7	33.24	61.3	16.13	15.4
10.3	58.03 53	85.7 10	2.79 38	109.3 6	33.09 15	61.5 2	16.03 10	15.1 3
20.2	57.46 57	86.1 4	2.40 39	109.3 0	32.91 18	61.3 2	15.90 13	14.7 4
30.2	56.87 59	85.9 2	2.00 40	108.7 6	32.72 19	60.8 5	15.76 14	14.2 5
Feb. 9.2	56.28 59	85.1 8	1.61 39	107.5 12	32.53 19	60.0 8	15.62 14	13.5 7
	56	13	36	17	19	11	14	8
19.2	55.72	83.8	1.25	105.8	32.34	58.9	15.48	12.7
Mar. 1.1	55.22 50	82.1 17	0.92 33	103.7 21	32.17 17	57.5 14	15.36 12	11.8 9
11.1	54.81 41	80.0 21	0.64 28	101.1 26	32.04 13	55.9 16	15.26 10	10.9 9
21.1	54.50 31	77.5 25	0.41 23	98.1 30	31.94 10	54.2 17	15.19 7	10.1 8
31.1	54.31 19	74.8 27	0.24 17	94.8 33	31.89 5	52.6 16	15.15 4	9.3 8
	6	27	9	35	0	16	1	6
Apr. 10.0	54.25	72.1	0.15	91.3	31.89	51.0	15.16	8.7
20.0	54.32 7	69.4 27	0.13 2	87.7 36	31.96 7	49.5 15	15.22 6	8.3 4
30.0	54.54 22	66.8 26	0.19 6	84.0 37	32.09 13	48.2 13	15.32 10	8.1 2
May 9.9	54.89 35	64.5 23	0.33 14	80.2 38	32.27 18	47.2 10	15.47 15	8.1 0
19.9	55.35 46	62.5 20	0.55 22	76.5 37	32.51 24	46.5 7	15.67 20	8.4 3
	57	16	30	35	29	4	24	6
29.9	55.92	60.9	0.85	73.0	32.80	46.1	15.91	9.0
June 8.9	56.59 67	59.7 12	1.21 36	69.8 32	33.13 33	46.1 0	16.19 28	9.8 8
18.8	57.33 74	59.0 7	1.63 42	66.9 29	33.49 36	46.5 4	16.50 31	10.9 11
28.8	58.12 79	58.7 3	2.10 47	64.4 25	33.88 39	47.2 7	16.83 33	12.2 13
July 8.8	58.95 83	59.0 3	2.61 51	62.3 21	34.28 40	48.3 11	17.17 34	13.7 15
	84	8	53	16	41	14	34	17
18.8	59.79 83	59.8	3.14	60.7	34.69	49.7	17.51	15.4
28.7	60.62 83	61.0 12	3 67 53	59.7 10	35.09 40	51.4 17	17.85 34	17.2 18
Aug. 7.7	61.42 80	62.7 17	4.19 52	59.3 4	35.48 39	53.3 19	18.18 33	19.0 18
17.7	62.19 77	64.8 21	4.69 50	59.5 2	35.85 37	55.4 21	18.50 32	20.9 19
27.6	62.91 72	67.3 25	5.16 47	60.2 7	36.19 34	57.6 22	18.79 29	22.7 18
	65	28	42	13	31	23	27	18
Sept. 6.6	63.56	70.1	5.58	61.5	36.50	59.9	19.06	24.5
16.6	64.13 57	73.1 30	5.94 36	63.3 18	36.78 28	62.3 24	19.30 24	26.2 17
26.6	64.62 49	76.4 33	6.23 29	65.6 23	37.02 24	64.7 24	19.51 21	27.8 16
Oct. 6.5	65.02 40	79.8 34	6.44 21	68.2 26	37.22 20	67.1 24	19.68 17	29.2 14
16.5	65.32 30	83.3 35	6.58 14	71.1 29	37.38 16	69.4 23	19.82 14	30.5 13
	19	34	6	30	12	22	11	11
26.5	65.51	86.7	6.64	74.1	37.50	71.6	19.93	31.6
Nov. 5.5	65.60 9	90.1 34	6.61 3	77.1 30	37.58 8	73.6 20	20.01 8	32.5 9
15.4	65.59 1	93.4 33	6.51 10	80.0 29	37.63 5	75.4 18	20.06 5	33.2 7
25.4	65.47 12	96.4 30	6.34 17	82.7 27	37.63 0	77.0 16	20.07 1	33.8 6
Dec. 5.4	65.24 23	99.1 27	6.10 24	85.1 24	37.59 4	78.4 14	20.05 2	34.2 4
	33	23	29	20	7	11	4	2
15.3	64.91	101.4	5.81	87.1	37.52	79.5	20.01	34.4
25.3	64.50 41	103.2 18	5.47 34	88.6 15	37.41 11	80.3 8	19.94 7	34.4 0
35.3	64.01 49	104.6 14	5.10 37	89.5 9	37.27 14	80.7 4	19.85 9	34.3 1
Sec δ, Tan δ	3.237	+3.079	2.130	−1.880	1.344	+0.898	1.087	+0.425
Mean Place	58°.782	63''.32	1°.317	94''.61	33°.178	45''.99	15°.924	5''.55
D' + α, D∞ α	+0.04	−0.18	−0.02	+0.11	+0.01	−0.05	+0.01	−0.02
D + δ, D∞ δ	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5	+0.3	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Fornacis. Mag. 5.2			γ Trianguli. Mag. 4.1			67 Ceti. Mag. 5.7			ϕ Eridani. Mag. 3.8		
	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination S.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	2	9	-31 7	2	12	+33 26	2	12	-6 48	2	13	-51 54
	s		"	s		"	s		"	s		"
Jan. 0.3	5.17		61.7	8.47		56.4	39.08		81.3	25.42		64.2
10.3	5.03	14	62.7 10	8.35	12	56.5 1	38.98	10	82.1 8	25.16	26	65.1 9
20.3	4.87	16	63.2 5	8.21	14	56.3 2	38.86	12	82.7 6	24.89	27	65.5 4
30.2	4.70	17	63.4 2	8.05	16	55.8 5	38.73	13	83.2 5	24.61	28	65.4 1
Feb. 9.2	4.53	17	63.2 2	7.88	17	55.1 7	38.60	13	83.5 3	24.33	28	64.7 7
		17	7		16	9		13	1		27	12
19.2	4.36		62.5	7.72		54.2	38.47		83.6	24.06		63.5
Mar. 1.2	4.20	16	61.4 11	7.57	15	53.1 11	38.35	12	83.4 2	23.81	25	61.8 17
11.1	4.07	13	60.0 14	7.44	13	51.9 12	38.25	10	83.0 4	23.59	22	59.6 22
21.1	3.97	10	58.3 17	7.35	9	50.6 13	38.17	8	82.4 6	23.40	19	57.1 25
31.1	3.90	7	56.2 21	7.30	5	49.4 12	38.13	4	81.5 9	23.26	14	54.2 29
		3	24		1	12		1	11		8	32
Apr. 10.0	3.87		53.8	7.29		48.2	38.12		80.4	23.18		51.0
20.0	3.89	2	51.2 26	7.34	5	47.1 11	38.15	3	79.1 13	23.16	2	47.7 33
30.0	3.96	7	48.4 28	7.44	10	46.3 8	38.23	8	77.6 15	23.20	4	44.2 35
May 10.0	4.08	12	45.5 29	7.59	15	45.7 6	38.35	12	75.9 17	23.31	11	40.6 36
19.9	4.24	16	42.5 30	7.80	21	45.4 3	38.52	17	73.9 20	23.48	17	37.1 35
		21	30		25	0		21	21		23	35
29.9	4.45		39.5	8.05		45.4	38.73		71.8	23.71		33.6
June 8.9	4.70	25	36.5 30	8.34	29	45.7 3	38.97	24	69.7 21	23.99	28	30.3 33
18.9	4.99	29	33.7 28	8.67	33	46.3 6	39.24	27	67.5 22	24.32	33	27.2 31
28.8	5.30	31	31.1 26	9.02	35	47.2 9	39.53	29	65.3 22	24.69	37	24.5 27
July 8.8	5.63	33	28.8 23	9.38	36	48.4 12	39.84	31	63.2 21	25.09	40	22.2 23
		34	20		37	14		32	19		42	19
18.8	5.97		26.8	9.75		49.8	40.16		61.3	25.51		20.3
28.7	6.31	34	25.2 16	10.12	37	51.4 16	40.47	31	59.5 18	25.94	43	18.9 14
Aug. 7.7	6.65	34	24.0 12	10.48	36	53.2 18	40.78	31	57.9 16	26.37	43	18.1 8
17.7	6.98	33	23.3 7	10.83	35	55.1 19	41.08	30	56.6 13	26.78	41	17.8 3
27.7	7.28	30	23.0 3	11.15	32	57.1 20	41.36	28	55.6 10	27.17	39	18.1 3
		27	2		30	20		25	7		35	9
Sept. 6.6	7.55		23.2	11.45		59.1	41.61		54.9	27.52		19.0
16.6	7.79	24	23.9 7	11.72	27	61.1 20	41.83	22	54.5 4	27.83	31	20.4 14
26.6	8.00	21	25.0 11	11.95	23	63.1 20	42.03	20	54.4 1	28.09	26	22.3 19
Oct. 6.6	8.17	17	26.5 15	12.15	20	65.0 19	42.20	17	54.7 3	28.29	20	24.6 23
16.5	8.30	13	28.3 18	12.32	17	66.8 18	42.34	14	55.2 5	28.44	15	27.1 25
		9	20		13	17		10	8		9	28
26.5	8.39		30.3	12.45		68.5	42.44		56.0	28.53		29.9
Nov. 5.5	8.44	5	32.4 21	12.54	9	70.0 15	42.51	7	56.9 9	28.56	3	32.8 29
15.4	8.45	1	34.6 22	12.60	6	71.4 14	42.55	4	57.9 10	28.54	2	35.7 29
25.4	8.43	2	36.8 22	12.63	3	72.6 12	42.57	2	59.0 11	28.46	8	38.5 28
Dec. 5.4	8.38	5	38.8 20	12.62	1	73.6 10	42.56	1	60.1 11	28.33	13	41.0 25
		8	18		5	7		4	11		18	21
15.4	8.30		40.6	12.57		74.3	42.52		61.2	28.15		43.1
25.3	8.19	11	42.2 16	12.49	8	74.8 5	42.45	7	62.2 10	27.94	21	44.8 17
35.3	8.05	14	43.4 12	12.39	10	75.0 2	42.36	9	63.1 9	27.70	24	46.1 13
Sec δ , Tan δ	1.168		-0.604	1.198		+0.660	1.007		-0.120	1.621		-1.276
Mean Place	4 ^h .355		54 ^m .73	8 ^h .257		43 ^m .24	38 ^h .571		81 ^m .69	23 ^h .991		52 ^m .73
D ⁺ δ , D ₊ α	-0.01		+0.03	+0.01		-0.04	0.00		+0.01	-0.02		+0.07
D ⁺ δ , D ₊ δ	+0.3		+0.5	+0.3		+0.5	+0.3		+0.5	+0.3		+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o Ceti. Var. 1.7-9.6		κ Fornacis. Mag. 5.4		δ Hydri. Mag. 4.3		ι Cassiopeiæ. Mag. 4.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 2 14	° ' — 3 21	h m 2 18	° ' — 24 12	h m 2 20	° ' — 69 2	h m 2 21	° ' + 67 0
	s	"	s	"	s	"	s	"
Jan. 0.3	57.52	77.9 8	34.42	45.6 9	14.62	91.6 8	53.18	63.9 11
10.3	57.42 10	78.7 6	34.30 12	46.5 9	14.08 54	92.4 8	52.81 37	65.0 11
20.3	57.31 11	79.3 6	34.16 14	47.2 7	13.52 56	92.6 2	52.39 42	65.6 6
30.2	57.19 12	79.8 5	34.00 16	47.6 4	12.95 57	92.2 4	51.95 44	65.7 1
Feb. 9.2	57.06 13	80.1 3	33.84 16	47.6 0	12.38 57	91.2 10	51.50 45	65.2 5
	13	2	15	4	55	15	44	10
19.2	56.93	80.3 0	33.69	47.2 8	11.83	89.7 21	51.06	64.2 14
Mar. 1.2	56.81 12	80.3 0	33.55 14	46.4 8	11.32 51	87.6 21	50.65 41	62.8 14
11.1	56.70 11	80.1 2	33.42 13	45.3 11	10.87 45	85.1 25	50.29 36	60.9 19
21.1	56.62 8	79.7 4	33.32 10	43.9 14	10.48 39	82.2 29	50.01 28	58.7 22
31.1	56.58 4	79.0 7	33.25 7	42.2 17	10.17 31	79.0 32	49.82 19	56.3 24
	1	9	3	20	22	35	9	25
Apr. 10.0	56.57	78.1 11	33.22	40.2 23	9.95	75.5 37	49.73	53.8 25
20.0	56.60 3	77.0 13	33.24 6	37.9 24	9.83 12	71.8 37	49.75 2	51.3 25
30.0	56.68 8	75.7 16	33.30 11	35.5 26	9.81 2	68.0 38	49.87 12	48.9 24
May 10.0	56.80 12	74.1 17	33.41 15	32.9 27	9.89 8	64.2 38	50.10 23	46.6 23
19.9	56.97 17	72.4 19	33.56 20	30.2 28	10.07 18	60.5 37	50.44 34	44.6 20
	20		20		29	36	43	16
29.9	57.17	70.5 20	33.76	27.4 28	10.36	56.9 34	50.87	43.0 13
June 8.9	57.41 24	68.5 21	34.00 27	24.6 27	10.74 38	53.5 31	51.39 52	41.7 9
18.9	57.68 27	66.4 21	34.27 30	21.9 25	11.20 46	50.4 27	51.97 58	40.8 4
28.8	57.97 29	64.3 20	34.57 32	19.4 23	11.73 53	47.7 22	52.60 67	40.4 1
July 8.8	58.28 31	62.3 19	34.89 33	17.1 21	12.32 59	45.5 17	53.27 68	40.5 5
	32				63			
18.8	58.60	60.4 18	35.22	15.0 17	12.95	43.8 11	53.95	41.0 10
28.7	58.92 32	58.6 16	35.55 33	13.3 14	13.60 65	42.7 6	54.64 69	42.0 14
Aug. 7.7	59.23 31	57.0 14	35.87 32	11.9 10	14.26 66	42.1 0	55.32 68	43.4 18
17.7	59.52 29	55.6 11	36.18 31	10.9 5	14.90 64	42.1 7	55.98 62	45.2 21
27.7	59.80 28	54.5 8	36.48 27	10.4 1	15.51 61	42.8 12	56.60 58	47.3 25
	26				56			
Sept. 6.6	60.06	53.7 6	36.75	10.3 4	16.07	44.0 18	57.18	49.8 27
16.6	60.29 23	53.1 2	36.99 21	10.7 8	16.56 49	45.8 22	57.70 52	52.5 29
26.6	60.48 19	52.9 1	37.20 17	11.5 11	16.96 40	48.0 27	58.16 46	55.4 31
Oct. 6.6	60.65 17	53.0 3	37.37 14	12.6 15	17.27 31	50.7 30	58.56 32	58.5 32
16.5	60.79 14	53.3 5	37.51 10	14.1 17	17.48 21	53.7 31	58.88 24	61.7 33
	11				11			
26.5	60.90	53.8 7	37.61	15.8 19	17.59 0	56.8 32	59.12 16	65.0 32
Nov. 5.5	60.97 7	54.5 9	37.68 3	17.7 19	17.59 12	60.0 31	59.28 8	68.2 30
15.4	61.02 5	55.4 9	37.71 0	19.6 19	17.47 22	63.1 29	59.36 1	71.2 29
25.4	61.04 1	56.3 10	37.71 6	21.5 17	17.25 30	66.0 22	59.35 18	74.1 27
Dec. 5.4	61.03 3	57.3 10	37.68 11	23.4 12	16.95 39	68.6 22	59.26 18	76.8 23
15.4	61.00 6	58.3 9	37.62 9	25.1 15	16.56 46	70.8 17	59.08 26	79.1 19
25.3	60.94 9	59.2 8	37.53 11	26.6 12	16.10 52	72.5 12	58.82 32	81.0 14
35.3	60.85	60.0	37.42	27.8	15.58	73.7	58.50	82.4
Sec δ, Tan δ	1.002	-0.059	1.096	-0.450	2.797	-2.612	2.561	+2.358
Mean Place	57°.034	79''.57	33°.667	40''.94	11°.784	78''.20	52°.898	43''.19
D'ψ a, Dω a	0.00	0.00	-0.01	+0.02	-0.04	+0.14	+0.04	-0.13
Dψ δ, Dω δ	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ ³ Ceti. Mag. 4.3			σ Ceti. Mag. 4.8			38 H. Cassiopeiæ. Mag. 5.3			ν Ceti. Mag. 5.0		
	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination N.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	2	23	+ 8 4	2	27	- 15 37	2	29	+ 72 26	2	31	+ 5 12
	s		"	s		"	s		"	s		"
Jan. 0.3	32.31		19.8	58.43		34.7	44.58		40.3	18.89		56.0
10.3	32.22	9	19.3 5	58.33	10	35.7 10	44.09	49	41.7 14	18.80	9	55.4 6
20.3	32.11	11	18.8 5	58.21	12	36.4 7	43.54	55	42.6 9	18.69	11	54.8 6
30.2	31.98	13	18.3 5	58.07	14	36.9 5	42.94	60	42.9 3	18.57	12	54.3 5
Feb. 9.2	31.85	13	17.8 5	57.92	15	37.1 2	42.32	62	42.6 3	18.44	13	53.9 4
		13	4		15	1		60	9		14	4
19.2	31.72		17.4	57.77		37.0	41.72		41.7	18.30		53.5
Mar. 1.2	31.60	12	17.0 4	57.64	13	36.6 4	41.16	56	40.3 14	18.17	13	53.2 3
11.1	31.49	11	16.7 3	57.52	12	35.9 7	40.67	49	38.5 18	18.06	11	53.1 1
21.1	31.40	9	16.6 1	57.42	10	34.9 10	40.27	40	36.3 22	17.97	9	53.1 0
31.1	31.35	5	16.7 1	57.35	7	33.6 13	39.98	29	33.9 24	17.91	6	53.3 2
		1	2		3	15		16	26		2	4
Apr. 10.1	31.34		16.9	57.32		32.1	39.82		31.3	17.89		53.7
20.0	31.37	3	17.3 4	57.33	1	30.3 18	39.80	2	28.6 27	17.91	2	54.3 6
30.0	31.44	7	18.0 7	57.39	6	30.3 20	39.92	12	25.9 27	17.98	7	55.1 8
May 10.0	31.56	12	18.9 9	57.49	10	26.1 22	40.18	26	23.4 25	18.09	11	56.1 10
19.9	31.73	17	20.0 11	57.64	15	23.8 23	40.57	39	21.2 22	18.24	15	57.4 13
		21	13		19	24		51	19		20	14
29.9	31.94		21.3	57.83		21.4	41.08		19.3	18.44		58.8
June 8.9	32.18	24	22.7 14	58.06	23	18.9 25	41.70	62	17.7 16	18.68	24	60.4 16
18.9	32.45	27	24.3 16	58.32	26	16.5 24	42.41	71	16.6 11	18.94	26	62.1 17
28.8	32.75	30	26.0 17	58.60	28	14.1 24	43.18	77	15.9 7	19.23	29	63.9 18
July 8.8	33.06	31	27.8 18	58.91	31	11.8 23	44.01	83	15.7 2	19.54	31	65.7 18
		32	18		32	20		86	3		32	18
18.8	33.38		29.6	59.23		9.8	44.87		16.0	19.86		67.5
28.8	33.70	32	31.4 18	59.55	32	8.0 18	45.74	87	16.7 7	20.18	32	69.3 18
Aug. 7.7	34.02	32	33.1 17	59.86	31	6.5 15	46.60	86	17.9 12	20.49	31	70.9 16
17.7	34.32	30	34.6 15	60.16	30	5.3 12	47.44	84	19.6 17	20.79	30	72.4 15
27.7	34.61	29	36.0 14	60.45	29	4.5 8	48.24	80	21.6 20	21.08	29	73.7 13
		26	13		27	4		74	24		27	11
Sept. 6.6	34.87		37.3	60.72		4.1	48.98		24.0	21.35		74.8
16.6	35.11	24	38.3 10	60.96	24	4.1 0	49.66	68	26.7 27	21.59	24	75.7 9
26.6	35.32	21	39.1 8	61.17	21	4.5 4	50.26	60	29.7 30	21.80	21	76.3 6
Oct. 6.6	35.50	18	39.6 5	61.35	18	5.2 7	50.78	52	32.8 31	21.99	19	76.7 4
16.5	35.66	16	39.9 3	61.50	15	6.2 10	51.21	43	36.1 33	22.15	16	76.9 2
		12	1		11	12		32	33		13	1
26.5	35.78		40.0	61.61		7.4	51.53		39.4	22.28		76.8
Nov. 5.5	35.87	9	40.0 0	61.69	8	8.8 14	51.74	21	42.8 34	22.38	10	76.6 2
15.5	35.94	7	39.8 2	61.74	5	10.4 16	51.85	11	46.1 33	22.44	6	76.2 4
25.4	35.97	3	39.5 3	61.76	2	12.0 16	51.84	1	49.2 31	22.48	4	75.7 5
Dec. 5.4	35.97	0	39.1 4	61.75	1	13.6 16	51.71	13	52.1 29	22.49	1	75.1 6
		2	4		4	15		24	26		2	6
15.4	35.95		38.7	61.71		15.1	51.47		54.7	22.47		74.5
25.3	35.90	5	38.2 5	61.65	6	16.4 13	51.13	34	56.9 22	22.43	4	73.9 6
35.3	35.82	8	37.6 6	61.56	9	17.5 11	50.70	43	58.6 17	22.36	7	73.3 6
Sec δ, Tan δ	1.010		+0.142	1.038		-0.280	3.315		+3.161	1.004		+0.091
Mean Place	31 ^h .872		14 ^m '' .27	57 ^h .750		33 ^m '' .07	44 ^h .075		19 ^m '' .00	18 ^h .386		51 ^m '' .12
D'φ α, D _α α	0.00		-0.01	0.00		+0.01	+0.05		-0.17	0.00		-0.01
D'δ, D _δ δ	+0.3		+0.6	+0.3		+0.6	+0.3		+0.6	+0.3		+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Hydri. Mag. 5.3		ν Arietis. Mag. 5.4		δ Ceti. Mag. 4.0		ϵ Hydri. Mag. 4.3	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 2 33 s	° ' -79 28 "	h m 2 33 s	° ' +21 35 "	h m 2 35 s	° ' - 0 2 "	h m 2 38 s	° ' -68 37 "
Jan. 0.3	35.21	93.9 8	52.82	18.6 2	1.88	43.0 7	17.78	94.7 10
10.3	34.05 ¹¹⁶	94.7 2	52.73 ⁹	18.4 3	1.79 ⁹	43.7 6	17.27 ⁵¹	95.7 5
20.3	32.83 ¹²²	94.9 4	52.61 ¹²	18.1 4	1.68 ¹¹	44.3 5	16.72 ⁵⁵	96.2 1
30.2	31.59 ¹²⁴	94.5 10	52.47 ¹⁴	17.7 5	1.55 ¹³	44.8 4	16.15 ⁵⁷	96.1 7
Feb. 9.2	30.36 ¹²³ ¹¹⁹	93.5 15	52.33 ¹⁴ ¹⁵	17.2 7	1.42 ¹³ ¹³	45.2 3	15.58 ⁵⁷ ⁵⁶	95.4 13
19.2	29.17	92.0 21	52.18	16.5 7	1.29	45.5 1	15.02	94.1 18
Mar. 1.2	28.05 ¹¹²	89.9 25	52.04 ¹⁴	15.8 7	1.16 ¹³	45.6 1	14.49 ⁵³	92.3 23
11.1	27.03 ¹⁰²	87.4 29	51.92 ¹²	15.1 7	1.04 ¹²	45.5 2	14.01 ⁴⁸	90.0 27
21.1	26.14 ⁸⁹	84.5 33	51.82 ¹⁰	14.4 6	0.95 ⁹	45.3 5	13.59 ⁴²	87.3 31
31.1	25.40 ⁷⁴ ⁵⁸	81.2 35	51.76 ⁶ ²	13.8 5	0.89 ⁶ ³	44.8 7	13.24 ³⁵ ²⁷	84.2 34
Apr. 10.1	24.82	77.7 36	51.74	13.3 4	0.86	44.1 9	12.97	80.8 35
20.0	24.42 ⁴⁰	74.1 38	51.76 ²	12.9 2	0.87 ¹	43.2 11	12.80 ¹⁷	77.3 37
30.0	24.21 ²¹	70.3 38	51.83 ⁷	12.7 0	0.93 ⁶	42.1 13	12.73 ⁷	73.6 38
May 10.0	24.20 ¹	66.5 37	51.95 ¹²	12.7 3	1.04 ¹¹	40.8 15	12.76 ³	69.8 37
19.9	24.38 ¹⁸ ³⁷	62.8 36	52.12 ¹⁷ ²¹	13.0 5	1.19 ¹⁵ ¹⁹	39.3 17	12.89 ¹³ ²⁴	66.1 37
29.9	24.75	59.2 33	52.33	13.5 8	1.38	37.6 18	13.13	62.4 35
June 8.9	25.31 ⁵⁶	55.9 30	52.58 ²⁵	14.3 10	1.61 ²³	35.8 19	13.46 ³³	58.9 32
18.9	26.04 ⁷³	52.9 27	52.87 ²⁹	15.3 12	1.87 ²⁶	33.9 20	13.87 ⁴¹	55.7 28
28.8	26.92 ⁸⁸	50.2 22	53.18 ³¹	16.5 14	2.15 ²⁸	31.9 19	14.36 ⁴⁹	52.9 24
July 8.8	27.92 ¹⁰⁰ ¹¹⁰	48.0 16	53.51 ³³ ³⁴	17.9 15	2.45 ³⁰ ³¹	30.0 19	14.92 ⁵⁶ ⁶⁰	50.5 19
18.8	29.02	46.4 11	53.85	19.4 16	2.76	28.1 18	15.52	48.6 14
28.8	30.18 ¹¹⁶	45.3 6	54.19 ³⁴	21.0 16	3.08 ³²	26.3 16	16.15 ⁶³	47.2 8
Aug. 7.7	31.36 ¹¹⁸	44.7 1	54.52 ³³	22.6 17	3.39 ³¹	24.7 14	16.80 ⁶⁵	46.4 2
17.7	32.54 ¹¹⁸	44.8 7	54.84 ³²	24.3 16	3.69 ³⁰	23.3 12	17.44 ⁶⁴	46.2 5
27.7	33.68 ¹¹⁴ ¹⁰⁵	45.5 13	55.15 ³¹ ²⁹	25.9 15	3.98 ²⁹ ²⁷	22.1 9	18.05 ⁶¹ ⁵⁷	46.7 10
Sept. 6.6	34.73	46.8 18	55.44	27.4 15	4.25	21.2 7	18.62	47.7 16
16.6	35.66 ⁹³	48.6 23	55.70 ²⁶	28.9 14	4.49 ²⁴	20.5 4	19.13 ⁵¹	49.3 21
26.6	36.44 ⁷⁸	50.9 26	55.93 ²³	30.3 12	4.70 ²¹	20.1 1	19.56 ⁴³	51.4 25
Oct. 6.6	37.05 ⁶¹	53.5 30	56.13 ²⁰	31.5 11	4.89 ¹⁹	20.0 1	19.91 ³⁵	53.9 29
16.5	37.45 ⁴⁰ ¹⁸	56.5 32	56.31 ¹⁸ ¹⁴	32.6 9	5.05 ¹⁶ ¹³	20.1 4	20.16 ²⁵ ¹⁵	56.8 32
26.5	37.63	59.7 32	56.45	33.5 8	5.18	20.5 6	20.31	60.0 32
Nov. 5.5	37.59 ⁴	62.9 32	56.56 ¹¹	34.3 6	5.28 ¹⁰	21.1 7	20.35 ⁴	63.2 32
15.5	37.33 ²⁶	66.1 30	56.64 ⁸	34.9 5	5.35 ⁷	21.8 8	20.29 ⁶	66.4 30
25.4	36.86 ⁴⁷	69.1 26	56.69 ⁵	35.4 3	5.39 ⁴	22.6 8	20.12 ¹⁷	69.4 28
Dec. 5.4	36.19 ⁶⁷ ⁸⁵	71.7 22	56.71 ² ¹	35.7 2	5.40 ¹ ²	23.4 9	19.85 ²⁷ ³⁵	72.2 21
15.4	35.34	73.9 18	56.70	35.9 1	5.38	24.3 8	19.50	74.6 21
25.3	34.35 ⁹⁹	75.7 12	56.65 ⁵ ⁸	36.0 1	5.33 ⁵ ⁷	25.1 8	19.08 ⁴²	76.6 1
35.3	33.24 ¹¹¹	76.9	56.57	35.9	5.26	25.9	18.59 ⁴⁹	78.0
Sec δ , Tan δ	5.481	-5.389	1.075	+0.396	1.000	-0.001	2.746	-2.557
Mean Place	29°.124	80'' .83	52°.400	8'' .62	1°.315	46'' .27	14°.807	82'' .58
$D'\psi\alpha$, $D_\omega\alpha$	-0.09	+0.28	+0.01	-0.02	0.00	0.00	-0.04	+0.13
$D'\psi\delta$, $D_\omega\delta$	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Persei. Mag. 4.2		γ Ceti seq. Mag. 3.7		π Ceti. Mag. 4.4		μ Ceti. Mag. 4.4	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 2 38	° ' +48 51	h m 2 38	° ' + 2 52	h m 2 39	° ' -14 13	h m 2 40	° ' + 9 44
	s	"	s	"	s	"	s	"
Jan. 0.3	15.43	57.5	48.01	15.2	59.58	36.6	14.72	57.3
10.3	15.27 ¹⁶	58.2 ⁷	47.92 ⁹	14.5 ⁷	59.48 ¹⁰	37.7 ¹¹	14.63 ⁹	56.9 ⁴
20.3	15.07 ²⁰	58.6 ⁴	47.81 ¹¹	13.9 ⁶	59.36 ¹²	38.5 ⁸	14.52 ¹¹	56.4 ⁵
30.3	14.85 ²²	58.6 ⁰	47.69 ¹²	13.4 ⁵	59.22 ¹⁴	39.0 ⁵	14.40 ¹²	55.9 ⁵
Feb. 9.2	14.61 ²⁴	58.1 ⁵	47.56 ¹³	13.0 ⁴	59.08 ¹⁴	39.2 ²	14.27 ¹³	55.4 ⁵
	23	8	14	3	15	0	14	4
19.2	14.38	57.3	47.42	12.7	58.93	39.2	14.13	55.0
Mar. 1.2	14.16 ²²	56.1 ¹²	47.29 ¹³	12.5 ²	58.79 ¹⁴	38.9 ³	14.00 ¹³	54.6 ⁴
11.1	13.96 ²⁰	54.7 ¹⁴	47.17 ¹²	12.5 ⁰	58.66 ¹³	38.3 ⁶	13.88 ¹²	54.3 ³
21.1	13.80 ¹⁶	53.1 ¹⁶	47.07 ¹⁰	12.6 ¹	58.55 ¹¹	37.4 ⁹	13.78 ¹⁰	54.1 ²
31.1	13.69 ¹¹	51.3 ¹⁸	47.01 ⁶	12.9 ³	58.47 ⁸	36.3 ¹¹	13.72 ⁶	54.1 ⁰
	5	18	3	5	4	14	3	1
Apr. 10.1	13.64	49.5	46.98	13.4	58.43	34.9	13.69	54.2
20.0	13.65 ¹	47.7 ¹⁸	47.00 ²	14.1 ⁷	58.43 ⁰	33.2 ¹⁷	13.70 ¹	54.5 ³
30.0	13.73 ⁸	46.0 ¹⁷	47.06 ⁶	15.0 ⁹	58.48 ⁵	31.3 ¹⁹	13.76 ⁶	55.0 ⁵
May 10.0	13.88 ¹⁵	44.5 ¹⁵	47.16 ¹⁰	16.1 ¹¹	58.57 ⁹	29.2 ²¹	13.87 ¹¹	55.8 ⁸
20.0	14.09 ²¹	43.2 ¹³	47.30 ¹⁴	17.5 ¹⁴	58.71 ¹⁴	27.0 ²²	14.02 ¹⁵	56.8 ¹⁰
	27	10	19	15	18	24	20	11
29.9	14.36	42.2	47.49	19.0	58.89	24.6	14.22	57.9
June 8.9	14.69 ³³	41.6 ⁶	47.72 ²³	20.6 ¹⁶	59.11 ²²	22.2 ²⁴	14.45 ²³	59.2 ¹³
18.9	15.06 ³⁷	41.3 ³	47.98 ²⁶	22.4 ¹⁸	59.36 ²⁵	19.8 ²⁴	14.71 ²⁶	60.7 ¹⁵
28.8	15.47 ⁴¹	41.4 ¹	48.26 ²⁸	24.3 ¹⁹	59.64 ²⁸	17.4 ²⁴	15.00 ²⁹	62.3 ¹⁶
July 8.8	15.90 ⁴³	41.8 ⁴	48.56 ³⁰	26.2 ¹⁹	59.94 ³⁰	15.1 ²³	15.31 ³¹	64.0 ¹⁷
	44	8	32	18	31	21	32	17
18.8	16.34	42.6	48.88	28.0	60.25	13.0	15.63	65.7
28.8	16.79 ⁴⁵	43.7 ¹¹	49.20 ³²	29.7 ¹⁷	60.57 ³²	11.2 ¹⁸	15.95 ³²	67.4 ¹⁷
Aug. 7.7	17.24 ⁴⁵	45.1 ¹⁴	49.51 ³¹	31.3 ¹⁶	60.88 ³¹	9.7 ¹⁵	16.27 ³²	69.0 ¹⁶
17.7	17.68 ⁴⁴	46.8 ¹⁷	49.81 ³⁰	32.8 ¹⁵	61.19 ³¹	8.5 ¹²	16.58 ³¹	70.5 ¹⁵
27.7	18.09 ⁴¹	48.7 ¹⁹	50.10 ²⁹	34.1 ¹³	61.48 ²⁹	7.6 ⁹	16.88 ³⁰	71.9 ¹⁴
	38	21	27	10	27	5	27	12
Sept. 6.7	18.47	50.8	50.37	35.1	61.75	7.1	17.15	73.1
16.6	18.83 ³⁶	53.0 ²²	50.62 ²⁵	35.8 ⁷	62.00 ²⁵	7.0 ¹	17.40 ²⁵	74.1 ¹⁰
26.6	19.15 ³²	55.4 ²⁴	50.84 ²²	36.3 ⁵	62.22 ²²	7.3 ³	17.63 ²³	75.0 ⁹
Oct. 6.6	19.43 ²⁸	57.8 ²⁴	51.03 ¹⁹	36.6 ³	62.41 ¹⁹	7.9 ⁶	17.83 ²⁰	75.6 ⁶
16.5	19.67 ²⁴	60.2 ²⁴	51.19 ¹⁶	36.6 ⁰	62.57 ¹⁶	8.8 ⁹	18.00 ¹⁷	76.0 ⁴
	19	24	13	2	13	12	14	2
26.5	19.86	62.6	51.32	36.4	62.70	10.0	18.14	76.2
Nov. 5.5	20.01 ¹⁵	64.9 ²³	51.43 ¹¹	36.0 ⁴	62.79 ⁹	11.4 ¹⁴	18.25 ¹¹	76.2 ⁰
15.5	20.12 ¹¹	67.1 ²²	51.51 ⁸	35.4 ⁶	62.85 ⁶	12.9 ¹⁵	18.33 ⁸	76.0 ²
25.4	20.18 ⁶	69.2 ²¹	51.55 ⁴	34.8 ⁶	62.89 ⁴	14.5 ¹⁶	18.38 ⁵	75.8 ²
Dec. 5.4	20.18 ⁰	71.0 ¹⁸	51.56 ¹	34.1 ⁷	62.89 ⁰	16.1 ¹⁶	18.40 ²	75.5 ³
	4	16	1	8	3	15	1	4
15.4	20.14	72.6	51.55	33.3	62.86	17.6	18.39	75.1
25.4	20.05 ⁹	73.9 ¹³	51.51 ⁴	32.6 ⁷	62.80 ⁶	18.9 ¹³	18.35 ⁴	74.6 ⁵
35.3	19.91 ¹⁴	74.9 ¹⁰	51.44 ⁷	31.9 ⁷	62.72 ⁸	20.1 ¹²	18.29 ⁶	74.1 ⁵
Sec δ , Tan δ	1.520	+1.145	1.001	+0.050	1.032	-0.254	1.015	+0.172
Mean Place	15°.027	40'' .32	47°.453	10'' .89	58°.854	35'' .87	14°.196	50'' .84
$D_{\delta} \alpha$, $D_{\alpha} \alpha$	+0.02	-0.06	0.00	0.00	0.00	+0.01	0.00	-0.01
$D_{\delta} \delta$, $D_{\alpha} \delta$	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6	+0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Persei. Mag. 3.9		δ Arietis. Mag. 3.7		β Fornacis. Mag. 4.5		σ Arietis. Mag. 5.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 2 44 s	° ' +55 32 "	h m 2 44 s	° ' +26 54 "	h m 2 45 s	° ' -32 45 "	h m 2 46 s	° ' +14 43 "
Jan. 0.3	21.00	25.3	52.00	21.0	28.01	80.8	41.72	34.7
10.3	20.81 19	26.3 10	51.90 10	21.0 0	27.87 14	82.1 13	41.64 8	34.4 3
20.3	20.57 24	26.9 6	51.78 12	20.8 2	27.71 16	83.0 9	41.53 11	34.0 4
30.3	20.30 27	27.0 1	51.64 14	20.5 3	27.53 18	83.5 5	41.41 12	33.6 4
Feb. 9.2	20.01 29	26.7 3	51.49 15	20.1 4	27.34 19	83.5 0	41.27 14	33.1 5
19.2	19.72 29	26.0 7	51.33 16	19.5 6	27.15 19	83.1 4	41.12 15	32.6 5
Mar. 1.2	19.45 27	24.8 12	51.18 15	18.7 8	26.97 18	82.2 9	40.98 14	32.1 5
11.1	19.20 25	23.3 15	51.04 14	17.8 9	26.80 17	81.0 12	40.86 12	31.6 5
21.1	19.00 20	21.6 17	50.93 11	16.9 9	26.65 15	79.4 16	40.76 10	31.2 4
31.1	18.85 15	19.6 20	50.85 8	16.1 8	26.54 11	77.4 20	40.69 7	31.0 2
Apr. 10.1	18.77 8	17.5 21	50.82 3	15.3 8	26.47 7	75.1 23	40.65 4	30.9 1
20.0	18.77 0	15.4 21	50.83 1	14.6 7	26.45 2	72.6 25	40.66 1	30.9 0
30.0	18.84 7	13.4 20	50.89 6	14.1 5	26.47 2	69.8 28	40.72 6	31.1 2
May 10.0	18.99 15	11.6 18	51.00 11	13.8 3	26.54 7	66.9 29	40.82 10	31.5 4
20.0	19.22 23	10.0 16	51.17 17	13.7 1	26.66 12	63.9 30	40.97 15	32.1 6
29.9	19.52 30	8.6 14	51.38 21	13.9 2	26.83 17	60.8 31	41.16 19	32.9 8
June 8.9	19.88 36	7.6 10	51.63 25	14.3 4	27.05 22	57.7 31	41.39 23	34.0 11
18.9	20.29 41	7.0 6	51.92 29	15.0 7	27.31 26	54.8 29	41.66 27	35.2 12
28.8	20.74 45	6.8 2	52.24 32	15.9 9	27.60 29	52.0 28	41.96 30	36.6 14
July 8.8	21.22 48	6.9 1	52.57 33	17.0 11	27.91 31	49.5 25	42.27 31	38.1 15
18.8	21.72 50	7.4 5	52.92 35	18.3 13	28.24 33	47.3 22	42.59 32	39.7 16
28.8	22.23 51	8.3 9	53.27 35	19.8 15	28.58 34	45.4 19	42.92 33	41.3 16
Aug. 7.7	22.74 51	9.6 13	53.62 35	21.3 15	28.92 34	44.0 14	43.24 32	42.9 16
17.7	23.23 49	11.2 16	53.96 34	22.9 16	29.26 34	43.1 9	43.56 32	44.4 15
27.7	23.70 47	13.0 18	54.28 32	24.5 16	29.58 32	42.7 4	43.86 30	45.9 15
Sept. 6.7	24.15 45	15.1 21	54.59 31	26.2 17	29.88 30	42.7 0	44.14 28	47.2 13
16.6	24.56 41	17.4 23	54.87 28	27.8 16	30.15 27	43.2 5	44.40 26	48.4 12
26.6	24.93 37	19.9 25	55.12 25	29.3 15	30.39 24	44.2 10	44.64 24	49.4 10
Oct. 6.6	25.25 32	22.5 26	55.34 22	30.7 14	30.60 21	45.7 15	44.85 21	50.2 8
16.5	25.53 28	25.2 27	55.53 19	32.0 13	30.77 17	47.5 18	45.03 18	50.9 7
26.5	25.76 23	27.9 27	55.69 16	33.2 12	30.90 13	49.6 21	45.18 15	51.4 5
Nov. 5.5	25.94 18	30.5 26	55.82 13	34.3 11	30.99 9	51.9 23	45.30 12	51.7 3
15.5	26.06 12	33.0 25	55.92 10	35.2 9	31.04 5	54.3 24	45.39 9	51.9 2
25.4	26.12 6	35.4 24	55.98 6	36.0 8	31.05 1	56.7 24	45.45 6	51.9 0
Dec. 5.4	26.12 0	37.6 22	56.01 3	36.6 6	31.03 2	59.0 23	45.48 3	51.8 1
15.4	26.07 5	39.6 20	56.00 1	37.1 5	30.97 6	61.1 21	45.47 1	51.7 1
25.4	25.96 11	41.2 16	55.96 4	37.4 3	30.88 9	63.0 19	45.43 4	51.5 2
35.3	25.79 17	42.4 12	55.89 7	37.6 2	30.75 13	64.5 15	45.37 6	51.1 4
Sec δ , Tan δ	1.767	+1.457	1.121	+0.507	1.189	-0.644	1.034	+0.263
Mean Place	20 ^h .514	6 ^m .75	51 ^h .533	9 ^m .31	26 ^h .968	75 ^m .34	41 ^h .196	26 ^m .58
D ['] ψ α , D _{∞} α	+0.03	-0.07	+0.01	-0.03	-0.01	+0.03	0.00	-0.01
D ψ δ , D _{∞} δ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ^1 Eridani. Mag. 4.8			τ Persei. Mag. 4.1			η Eridani. Mag. 4.0			ϵ Arietis (<i>mean</i>). Mag. 4.6		
	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	2	47	-21 21	2	48	+52 24	2	52	- 9 14	2	54	+20 59
	s		"	s		"	s		"	s		"
Jan. 0.3	6.31		45.8	5.37		43.8	11.34		36.7	14.57		44.7
10.3	6.20	11	46.9	5.20	17	44.8	11.25	9	37.6	14.49	8	44.6
20.3	6.07	13	47.8	4.99	21	45.3	11.14	11	38.4	14.38	11	44.4
30.3	5.92	15	48.4	4.75	24	45.4	11.01	13	39.0	14.25	13	44.0
Feb. 9.2	5.76	16	48.6	4.49	26	45.1	10.87	14	39.4	14.11	14	43.5
		16			27			15			15	
19.2	5.60		48.4	4.22		44.4	10.72		39.5	13.96		43.0
Mar. 1.2	5.44	16	47.9	3.97	25	43.3	10.58	14	39.4	13.81	15	42.4
		15			23			13			14	
11.1	5.29		47.1	3.74		41.9	10.45		39.0	13.67		41.8
		12			19			11			11	
21.1	5.17		46.0	3.55		40.2	10.34		38.4	13.56		41.2
		9			13			8			8	
31.1	5.08		44.5	3.42		38.4	10.26		37.5	13.48		40.6
		5			7			5			4	
Apr. 10.1	5.03		42.7	3.35		36.5	10.21		36.4	13.44		40.1
		1			1						0	
20.0	5.02		40.7	3.34		34.5	10.20		35.1	13.44		39.8
		3			6			13			5	
30.0	5.05		38.5	3.40		32.6	10.24		33.5	13.49		39.6
		8			14			16			10	
May 10.0	5.13		36.1	3.54		30.9	10.32		31.7	13.59		39.6
		12			21			18			15	
20.0	5.25		33.5	3.75		29.4	10.45		29.7	13.74		39.8
		17			28			21			20	
29.9	5.42		30.9	4.03		28.2	10.62		27.6	13.94		40.3
June 8.9	5.63	21	28.2	4.37	34	27.3	10.83	21	25.4	14.17	23	41.0
		25			38			24			27	
18.9	5.88		25.5	4.75		26.8	11.07		23.2	14.44		41.9
		28			42			27			30	
28.8	6.16		23.0	5.17		26.7	11.34		21.0	14.74		43.0
		30			45			30			32	
July 8.8	6.46		20.6	5.62		26.9	11.64		18.8	15.06		44.3
		31			47			31			33	
18.8	6.77		18.4	6.09		27.4	11.95		16.8	15.39		45.7
		32			48			31			33	
28.8	7.09		16.6	6.57		28.3	12.26		15.0	15.72		47.2
		33			48			31			34	
Aug. 7.7	7.42		15.1	7.05		29.6	12.57		13.4	16.06		48.7
		31			46			31			33	
17.7	7.73		13.9	7.51		31.2	12.88		12.1	16.39		50.2
		30			45			29			31	
27.7	8.03		13.2	7.96		33.0	13.17		11.1	16.70		51.7
		28			42			27			30	
Sept. 6.7	8.31		12.9	8.38		35.0	13.44		10.5	17.00		53.1
		26			39			25			28	
16.6	8.57		13.1	8.77		37.2	13.69		10.2	17.28		54.5
		23			35			23			25	
26.6	8.80		13.7	9.12		39.6	13.92		10.2	17.53		55.7
		20			31			20			22	
Oct. 6.6	9.00		14.6	9.43		42.0	14.12		10.6	17.75		56.8
		16			27			18			19	
16.5	9.16		15.9	9.70		44.5	14.30		11.3	17.94		57.8
		13			23			14			17	
26.5	9.29		17.5	9.93		47.0	14.44		12.2	18.11		58.6
		10			17			11			13	
Nov. 5.5	9.39		19.3	10.10		49.5	14.55		13.4	18.24		59.3
		7			12			8			10	
15.5	9.46		21.2	10.22		51.9	14.63		14.7	18.34		59.9
		3			7			5			7	
25.4	9.49		23.1	10.29		54.2	14.68		16.0	18.41		60.3
		0			2			1			4	
Dec. 5.4	9.49		25.0	10.31		56.2	14.69		17.4	18.45		60.6
		4			4			1			0	
15.4	9.45		26.8	10.27		58.0	14.68		18.7	18.45		60.8
		6			9			4			3	
25.4	9.39		28.4	10.18		59.5	14.64		19.9	18.42		60.8
		9			15			7			6	
35.3	9.30		29.7	10.03		60.7	14.57		21.0	18.36		60.7
Sec δ , Tan δ	1.074		-0.391	1.639		+1.299	1.013		-0.163	1.071		+0.384
Mean Place	5 ^s .453		43'' .32	4 ^s .865		25'' .92	10 ^s .608		37'' .82	14 ^s .034		34'' .63
D ['] α , D ₀ α	-0.01		+0.02	+0.02		-0.06	0.00		+0.01	+0.01		-0.02
D ['] δ , D ₀ δ	+0.3		+0.7	+0.3		+0.7	+0.3		+0.7	+0.3		+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	47 H. Cephei. Mag. 5.7		θ Eridani. Mag. 3.4		α Ceti. Mag. 2.8		γ Persi. Mag. 3.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 2 54 s	° ' +79 4 "	h m 2 54 s	° ' -40 38 "	h m 2 57 s	° ' + 3 44 "	h m 2 58 s	° ' +53 9 "
Jan. 0.3	29.86	56.1	59.15	77.0	44.44	61.5	29.84	77.6
10.3	29.09 77	58.0 19	58.97 18	78.4 14	44.36 8	60.8 7	29.68 16	78.7 11
20.3	28.20 89	59.3 13	58.78 19	79.4 10	44.26 10	60.2 6	29.47 21	79.4 7
30.3	27.22 98	60.1 8	58.57 21	79.9 5	44.14 12	59.7 5	29.22 25	79.6 2
Feb. 9.2	26.19 103	60.2 1	58.34 23	79.9 0	44.00 14	59.3 4	28.95 27	79.4 2
	103	5	23	5	14	4	27	6
19.2	25.16	59.7	58.11	79.4	43.86	58.9	28.68	78.8
Mar. 1.2	24.19 97	58.7 10	57.89 22	78.5 9	43.72 14	58.7 2	28.42 26	77.8 10
	89	16	20	14	13	1	24	13
11.2	23.30 76	57.1 20	57.69 18	77.1 18	43.59 11	58.6 1	28.18 21	76.5 16
21.1	22.54 59	55.1 24	57.51 15	75.3 22	43.48 8	58.7 3	27.97 15	74.9 18
31.1	21.95 40	52.7 26	57.36 10	73.1 25	43.40 4	59.0 4	27.82 9	73.1 19
Apr. 10.1	21.55 19	50.1 28	57.26 5	70.6 28	43.36 0	59.4 6	27.73 2	71.2 19
20.0	21.36 4	47.3 28	57.21 0	67.8 30	43.36 4	60.0 8	27.71 5	69.3 19
30.0	21.40 24	44.5 28	57.21 5	64.8 32	43.40 8	60.8 11	27.76 13	67.4 18
May 10.0	21.64 46	41.7 26	57.26 11	61.6 33	43.48 13	61.9 13	27.89 20	65.6 16
20.0	22.10 66	39.1 23	57.37 16	58.3 33	43.61 18	63.2 14	28.09 26	64.0 13
29.9	22.76 84	36.8 20	57.53 21	55.0 33	43.79 21	64.6 15	28.35 33	62.7 10
June 8.9	23.60 100	34.8 16	57.74 25	51.7 31	44.00 25	66.1 17	28.68 38	61.7 7
18.9	24.60 111	33.2 12	57.99 29	48.6 29	44.25 27	67.8 18	29.06 42	61.0 3
28.9	25.71 123	32.0 7	58.28 33	45.7 27	44.52 29	69.6 18	29.48 45	60.7 1
July 8.8	26.94 129	31.3 2	58.61 35	43.0 23	44.81 31	71.4 18	29.93 47	60.8 4
18.8	28.23 133	31.1 2	58.96 36	40.7 18	45.12 32	73.2 17	30.40 49	61.2 8
28.8	29.56 135	31.3 7	59.32 36	38.9 14	45.44 31	74.9 16	30.89 49	62.0 11
Aug. 7.7	30.91 133	32.0 12	59.68 36	37.5 9	45.75 31	76.5 14	31.38 48	63.1 14
17.7	32.24 129	33.2 16	60.04 35	36.6 3	46.06 29	77.9 12	31.86 46	64.5 17
27.7	33.53 123	34.8 21	60.39 32	36.3 2	46.35 28	79.1 10	32.32 43	66.2 19
Sept. 6.7	34.76 114	36.9 24	60.71 30	36.5 8	46.63 26	80.1 8	32.75 41	68.1 21
16.6	35.90 103	39.3 28	61.01 26	37.3 13	46.89 23	80.9 5	33.16 37	70.2 23
26.6	36.93 91	42.1 30	61.27 23	38.6 17	47.12 21	81.4 2	33.53 33	72.5 24
Oct. 6.6	37.84 77	45.1 32	61.50 19	40.3 21	47.33 19	81.6 0	33.86 29	74.9 24
16.6	38.61 61	48.3 34	61.69 14	42.4 24	47.52 15	81.6 2	34.15 24	77.3 25
26.5	39.22 44	51.7 35	61.83 10	44.8 26	47.67 12	81.4 4	34.39 20	79.8 25
Nov. 5.5	39.66 26	55.2 35	61.93 5	47.4 27	47.79 10	81.0 5	34.59 14	82.3 24
15.5	39.92 6	58.7 34	61.98 1	50.1 27	47.89 6	80.5 6	34.73 9	84.7 23
25.4	39.98 13	62.1 32	61.99 3	52.8 26	47.95 3	79.9 7	34.82 3	87.0 21
Dec. 5.4	39.85 33	65.3 29	61.96 8	55.4 24	47.98 0	79.2 8	34.85 3	89.1 19
15.4	39.52 50	68.2 26	61.88 12	57.8 21	47.98 3	78.4 7	34.82 8	91.0 16
25.4	39.02 68	70.8 22	61.76 15	59.9 17	47.95 6	77.7 7	34.74 13	92.6 13
35.3	38.34	73.0	61.61	61.6	47.89	77.0	34.61	93.9
Sec δ, Tan δ	5.279	+5.184	1.319	-0.859	1.002	+0.066	1.668	+1.335
Mean Place	28°.216	34'' .50	57°.857	70'' .35	43°.790	56'' .38	29°.224	59'' .72
D'ψ a, Dω a	+0.09	-0.25	-0.02	+0.04	0.00	0.00	+0.02	-0.06
Dψ δ, Dω δ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ^3 Eridani. Mag. 4.2		ρ Persei. Var. 3.4-4.2		μ Horologii. Mag. 5.2		θ Hydri. Mag. 5.5	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 2 58 s	° ' -23 57 "	h m 2 59 s	° ' +38 30 "	h m 3 1 s	° ' -60 3 "	h m 3 2 s	° ' -72 13 "
Jan. 0.3	34.31	56.2	36.34	28.3	35.80	98.4	7.80	102.5
10.3	34.20 11	57.5 13	36.23 11	28.8 5	35.47 33	99.9 15	7.18 62	103.8 13
20.3	34.07 13	58.5 10	36.09 14	29.1 3	35.10 37	100.8 9	6.51 67	104.6 8
30.3	33.92 15	59.1 6	35.92 17	29.1 0	34.71 39	101.2 4	5.80 71	104.8 2
Feb. 9.2	33.75 17 18	59.3 2 1	35.73 19 19	28.8 3 6	34.31 40 40	101.0 2 8	5.07 73 72	104.4 4 10
19.2	33.57	59.2	35.54	28.2	33.91	100.2	4.35	103.4
Mar. 1.2	33.40 17	58.7 5	35.35 19	27.3 9	33.52 39	98.9 13	3.66 69	101.8 16
11.2	33.25 15	57.9 8	35.18 17	26.3 10	33.16 36	97.1 18	3.02 64	99.8 20
21.1	33.12 13	56.7 12	35.04 14	25.1 12	32.84 32	94.8 23	2.44 58	97.3 25
31.1	33.01 11 7	55.2 15 18	34.93 11 6	23.8 13 13	32.56 28 22	92.1 27 30	1.94 50 41	94.4 29 32
Apr. 10.1	32.94	53.4	34.87	22.5	32.34	89.1	1.53	91.2
20.0	32.91 3	51.3 21	34.86 1	21.2 13	32.19 15	85.8 33	1.23 30	87.8 34
30.0	32.93 2	49.0 23	34.91 5	20.0 12	32.12 7	82.3 35	1.04 19	84.2 36
May 10.0	32.99 6	46.5 25	35.02 11	19.0 10	32.12 0	78.7 36	0.98 6	80.5 37
20.0	33.10 11 16	43.8 27 28	35.19 17 22	18.2 8 5	32.20 8 16	75.0 37 37	1.04 6 18	76.7 38 37
29.9	33.26	41.0	35.41	17.7	32.36	71.3	1.22	73.0
June 8.9	33.46 20	38.2 28	35.67 26	17.4 3	32.59 23	67.8 35	1.51 29	69.5 35
18.9	33.70 24	35.5 27	35.98 31	17.4 0	32.89 30	64.5 33	1.91 40	66.2 33
28.9	33.97 27	32.9 26	36.32 34	17.7 3	33.25 36	61.4 31	2.42 51	63.2 30
July 8.8	34.27 30 31	30.4 25 22	36.69 37 38	18.3 6 8	33.66 41 45	58.7 27 23	3.01 59 66	60.6 26 21
18.8	34.58	28.2	37.07	19.1	34.11	56.4	3.67	58.5
28.8	34.90 32	26.3 19	37.46 39	20.2 11	34.59 48	54.7 17	4.38 71	56.9 16
Aug. 7.7	35.22 32	24.7 16	37.85 39	21.5 13	35.08 49	53.5 12	5.12 74	55.9 10
17.7	35.54 32	23.6 11	38.23 38	23.0 15	35.57 49	52.9 6	5.86 74	55.5 4
27.7	35.85 31 29	22.9 7 2	38.60 37 35	24.6 16 17	36.05 48 45	52.9 0 6	6.59 73 69	55.7 2 8
Sept. 6.7	36.14	22.7	38.95	26.3	36.50	53.5	7.28	56.5
16.6	36.40 26	22.9 2	39.27 32	28.1 18	36.92 42	54.7 12	7.91 63	57.9 14
26.6	36.64 24	23.5 6	39.57 30	29.9 18	37.29 37	56.5 18	8.47 56	59.9 20
Oct. 6.6	36.85 21	24.6 11	39.84 27	31.8 19	37.60 31	58.7 22	8.93 46	62.3 24
16.6	37.03 18 15	26.0 14 17	40.08 24 20	33.6 18 18	37.85 25 17	61.4 27 30	9.28 35 23	65.1 28 31
26.5	37.18	27.7	40.28	35.4	38.02	64.4	9.51	68.2
Nov. 5.5	37.29 11	29.6 19	40.44 16	37.1 17	38.12 10	67.5 31	9.61 10	71.5 33
15.5	37.36 7	31.6 20	40.56 12	38.7 16	38.15 3	70.7 32	9.58 3	74.8 33
25.4	37.40 4	33.7 21	40.65 9	40.2 15	38.10 5	73.8 31	9.42 16	78.0 32
Dec. 5.4	37.40 0 3	35.8 21 20	40.69 4 0	41.5 13 11	37.98 12 19	76.7 29 27	9.14 28 39	81.0 30 26
15.4	37.37	37.8	40.69	42.6	37.79	79.4	8.75	83.6
25.4	37.31 6	39.5 17	40.65 4	43.5 9	37.54 25	81.7 23	8.25 50	85.8 22
35.3	37.22 9	41.0 15	40.57 8	44.2 7	37.24 30	83.5 18	7.67 58	87.5 17
Sec δ , Tan δ	1.094	-0.444	1.278	+0.796	2.005	-1.737	3.278	-3.122
Mean Place	33°.365	53''.61	35°.776	13''.64	33°.547	88''.96	3°.924	91''.93
$D^* \alpha$, $D_{\infty} \alpha$	-0.01	+0.02	+0.01	-0.04	-0.03	+0.08	-0.06	+0.15
$D^* \delta$, $D_{\infty} \delta$	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Persel. Var. 2.1-3.2		δ Arietis. Mag. 4.5		12 Eridani. Mag. 4.0		48 H. Cephei. Mag. 5.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 3 2	° ' +40 37	h m 3 6	° ' +19 23	h m 3 8	° ' -29 19	h m 3 9	° ' +77 24
	s	"	s	"	s	"	s	"
Jan. 0.4	30.73	31.6 6	39.70	63.9 1	23.56	50.0 14	16.22	80.5 20
10.3	30.62 11	32.2 6	39.63 7	63.8 1	23.44 12	51.4 14	15.61 61	82.5 20
20.3	30.47 15	32.6 4	39.53 10	63.6 2	23.29 15	52.4 10	14.88 73	83.9 14
30.3	30.30 17	32.6 0	39.40 13	63.2 4	23.12 17	53.1 7	14.06 82	84.8 9
Feb. 9.2	30.11 19	32.3 3	39.25 15	62.8 4	22.94 18	53.4 3	13.19 87	85.1 3
	20	6	15	5	19	2	89	3
19.2	29.91	31.7 8	39.10	62.3 5	22.75	53.2 6	12.30	84.8 8
Mar. 1.2	29.71 20	30.9 8	38.95 15	61.8 5	22.56 19	52.6 6	11.44 86	84.0 8
11.2	29.53 18	29.8 11	38.81 14	61.3 5	22.39 17	51.7 9	10.65 79	82.6 14
21.1	29.38 15	28.5 13	38.69 12	60.8 5	22.24 15	50.4 13	9.96 69	80.7 19
31.1	29.26 12	27.2 13	38.60 9	60.3 5	22.12 12	48.7 17	9.41 55	78.4 23
	7	14	5	4	9	20	39	25
Apr. 10.1	29.19	25.8 13	38.55	59.9 2	22.03	46.7 23	9.02	75.9 27
20.1	29.18 1	24.5 13	38.54 1	59.7 2	21.98 5	44.4 23	8.80 22	73.2 27
30.0	29.23 5	23.2 13	38.58 4	59.6 1	21.98 0	41.8 26	8.78 2	70.5 27
May 10.0	29.34 11	22.0 12	38.67 9	59.7 1	22.03 5	39.1 27	8.95 17	67.8 27
20.0	29.50 16	21.1 9	38.81 14	60.0 3	22.13 10	36.2 29	9.31 36	65.2 26
	22	7	18	5	15	30	54	24
29.9	29.72	20.4 4	38.99	60.5 7	22.28	33.2 30	9.85 70	62.8 21
June 8.9	29.99 27	20.0 1	39.21 22	61.2 9	22.47 19	30.2 29	10.55 84	60.7 17
18.9	30.30 31	19.9 2	39.47 26	62.1 11	22.70 23	27.3 28	11.39 96	59.0 13
28.9	30.65 35	20.1 5	39.76 31	63.2 12	22.97 27	24.5 26	12.35 105	57.7 9
July 8.8	31.03 38	20.6 8	40.07 33	64.4 14	23.26 32	21.9 23	13.40 113	56.8 4
18.8	31.42 40	21.4 10	40.40 33	65.8 14	23.58 33	19.6 20	14.53 117	56.4 0
28.8	31.82 40	22.4 12	40.73 33	67.2 15	23.91 33	17.6 16	15.70 119	56.4 5
Aug. 7.8	32.22 39	23.6 14	41.06 33	68.7 14	24.24 33	16.0 11	16.89 119	56.9 10
17.7	32.61 38	25.0 16	41.39 31	70.1 14	24.57 31	14.9 6	18.08 116	57.9 15
27.7	32.99 36	26.6 18	41.70 30	71.5 13	24.88 30	14.3 2	19.24 111	59.4 18
Sept. 6.7	33.35	28.4 18	42.00	72.8 13	25.18	14.1 3	20.35 105	61.2 22
16.6	33.68 33	30.2 19	42.28 26	74.1 11	25.46 26	14.4 8	21.40 96	63.4 26
26.6	33.99 28	32.1 19	42.54 23	75.2 10	25.72 22	15.2 12	22.36 86	66.0 28
Oct. 6.6	34.27 24	34.0 19	42.77 21	76.2 8	25.94 19	16.4 16	23.22 74	68.8 31
16.6	34.51 21	35.9 19	42.98 18	77.0 7	26.13 16	18.0 19	23.96 61	71.9 33
26.5	34.72 17	37.8 18	43.16 14	77.7 5	26.29 12	19.9 22	24.57 47	75.2 33
Nov. 5.5	34.89 13	39.6 17	43.30 12	78.2 4	26.41 8	22.1 23	25.04 31	78.5 34
15.5	35.02 9	41.3 16	43.42 8	78.6 3	26.49 4	24.4 24	25.35 14	81.9 33
25.5	35.11 5	42.9 14	43.50 5	78.9 2	26.53 1	26.8 23	25.49 3	85.2 32
Dec. 5.4	35.16 0	44.3 13	43.55 1	79.1 1	26.54 3	29.1 21	25.46 21	88.4 30
15.4	35.16 5	45.6 10	43.56 2	79.2 0	26.51 7	31.2 19	25.25 37	91.4 27
25.4	35.11 9	46.6 8	43.54 5	79.2 1	26.44 10	33.1 17	24.88 52	94.1 22
35.3	35.02	47.4	43.49	79.1	26.34	34.8	24.36	96.3
Sec δ , Tan δ	1.317	+0.858	1.060	+0.352	1.147	-0.562	4.592	+4.482
Mean Place	30°.150	16''.39	39°.084	54''.19	22°.468	46''.56	14°.359	59''.34
D' ψ α , D ω α	+0.02	-0.04	+0.01	-0.02	-0.01	+0.03	+0.09	-0.20
D ψ δ , D ω δ	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Arietis. Mag. 5.0		38 Horologii (G.). Mag. 5.7		ζ Eridani. Mag. 4.9		τ Arietis. Mag. 5.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 3 9 s	° ' +20 43 "	h m 3 10 s	° ' -57 38 "	h m 3 11 s	° ' - 9 8 "	h m 3 16 s	° ' +20 50 "
Jan. 0.4	54.49	31.5	22.86	58.1	37.20	30.2	12.76	12.8
10.3	54.42 7	31.5 0	22.57 29	59.7 16	37.12 8	31.2 10	12.69 7	12.7 1
20.3	54.32 10	31.3 2	22.24 33	60.8 11	37.01 11	32.1 9	12.59 10	12.6 1
30.3	54.19 13	31.0 3	21.89 35	61.3 5	36.88 13	32.8 7	12.46 13	12.3 3
Feb. 9.2	54.04 15	30.6 4	21.52 37	61.3 0	36.74 14	33.2 4	12.32 14	11.9 4
	16	5	37	6	15	2	15	4
19.2	53.88	30.1	21.15	60.7	36.59	33.4	12.17	11.5
Mar. 1.2	53.73 15	29.6 5	20.78 37	59.5 12	36.44 15	33.3 1	12.01 16	11.0 5
11.2	53.59 14	29.0 6	20.43 35	57.8 17	36.30 14	33.0 3	11.86 15	10.5 5
21.1	53.47 12	28.5 5	20.12 31	55.7 21	36.17 13	32.4 6	11.73 13	9.9 6
31.1	53.38 9	28.0 5	19.86 26	53.2 25	36.07 10	31.6 8	11.64 9	9.4 5
	6	5	21	29	6	11	6	5
Apr. 10.1	53.32	27.5	19.65	50.3	36.01	30.5	11.58	8.9
20.1	53.30 2	27.2 3	19.50 15	47.1 32	35.99 2	29.2 13	11.56 2	8.6 3
30.0	53.34 4	27.0 2	19.42 8	43.7 34	36.01 2	27.7 15	11.59 3	8.4 2
May 10.0	53.43 9	27.0 0	19.41 1	40.1 36	36.07 6	26.0 17	11.67 8	8.4 0
20.0	53.56 13	27.2 2	19.48 7	36.5 36	36.18 11	24.1 19	11.79 12	8.6 2
	18	4	14	36	15	21	18	4
29.9	53.74	27.6	19.62	32.9	36.33	22.0	11.97	9.0
June 8.9	53.96 22	28.2 6	19.83 21	29.3 36	36.52 19	19.8 22	12.19 22	9.6 6
18.9	54.22 26	29.1 9	20.11 28	25.9 34	36.75 23	17.6 22	12.44 25	10.4 8
28.9	54.51 29	30.1 10	20.45 34	22.8 31	37.01 26	15.4 22	12.72 28	11.4 10
July 8.8	54.82 31	31.2 11	20.83 38	20.1 27	37.29 28	13.2 22	13.03 31	12.5 11
	33	13	42	23	30	20	33	12
18.8	55.15	32.5	21.25	17.8	37.59	11.2	13.36	13.7
28.8	55.48 33	33.9 14	21.70 45	15.9 19	37.90 31	9.4 18	13.69 33	15.0 13
Aug. 7.8	55.82 34	35.3 14	22.16 46	14.5 14	38.21 31	7.8 16	14.03 34	16.4 14
17.7	56.15 33	36.8 15	22.62 46	13.8 7	38.52 31	6.4 14	14.36 33	17.8 14
27.7	56.47 32	38.2 14	23.08 46	13.7 1	38.82 30	5.4 10	14.68 32	19.2 14
	30	13	43	5	28	7	31	13
Sept. 6.7	56.77	39.5	23.51	14.2	39.10	4.7	14.99	20.5
16.6	57.05 28	40.7 12	23.91 40	15.3 11	39.36 26	4.4 3	15.28 29	21.7 12
26.6	57.31 26	41.9 12	24.27 36	16.9 16	39.60 24	4.5 1	15.54 26	22.8 11
Oct. 6.6	57.55 24	42.9 10	24.58 31	19.0 21	39.82 22	4.9 4	15.78 24	23.8 10
16.6	57.76 21	43.8 9	24.83 25	21.5 25	40.01 19	5.5 6	16.00 22	24.7 9
	18	7	18	29	16	10	19	7
26.5	57.94	44.5	25.01	24.4	40.17	6.5	16.19	25.4
Nov. 5.5	58.09 15	45.1 6	25.13 12	27.5 31	40.30 13	7.7 12	16.35 16	26.0 6
15.5	58.21 12	45.6 5	25.18 5	30.7 32	40.40 10	9.0 13	16.47 12	26.4 4
25.5	58.30 9	46.0 4	25.15 3	33.8 31	40.47 7	10.4 14	16.56 9	26.8 4
Dec. 5.4	58.35 5	46.2 2	25.06 9	36.8 30	40.50 3	11.8 14	16.62 6	27.1 3
	2	2	15	27	0	14	3	1
15.4	58.37	46.4	24.91	39.5	40.50	13.2	16.65	27.2
25.4	58.35 2	46.5 1	24.70 21	41.9 24	40.47 3	14.5 13	16.64 1	27.3 1
35.3	58.30 5	46.4 1	24.43 27	43.9 20	40.41 6	15.7 12	16.59 5	27.3 0
Sec δ, Tan δ	1.069	+0.378	1.869	-1.578	1.013	-0.161	1.070	+0.381
Mean Place	53°.856	21''.42	20°.734	49''.64	36°.379	32''.07	12°.091	2''.60
D' α, D α	+0.01	-0.02	-0.03	+0.07	0.00	+0.01	+0.01	-0.02
D δ, D α	+0.3	+0.7	+0.3	+0.7	+0.3	+0.7	+0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>e</i> Eridani. Mag. 4.3		<i>ι</i> Hydri. Mag. 5.5		<i>α</i> Persei. Mag. 1.9		<i>ο</i> Tauri. Mag. 3.8	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 3 16 s	° ' " -43 23 "	h m 3 18 s	° ' " -77 41 "	h m 3 18 s	° ' " +49 33 "	h m 3 20 s	° ' " + 8 43 "
Jan. 0.4	28.64	72.9	12.13	93.4	7.03	25.5	8.49	31.1
10.3	28.47 17	74.6 17	11.21 92	94.9 15	6.90 13	26.6 11	8.43 6	30.6 5
20.3	28.28 19	75.8 12	10.21 100	95.9 10	6.73 17	27.3 7	8.34 9	30.1 5
30.3	28.06 22	76.5 7	9.14 107	96.2 3	6.52 21	27.6 3	8.22 12	29.6 5
Feb. 9.3	27.82 24	76.7 2	8.05 109	95.9 3	6.28 24	27.6 0	8.08 14	29.2 4
	24	3	109	8	25	4	15	3
19.2	27.58	76.4 8	6.96	95.1	6.03	27.2 8	7.93	28.9
Mar. 1.2	27.34 24	75.6 8	5.90 106	93.7 14	5.79 24	26.4 8	7.78 15	28.6 3
11.2	27.11 23	74.3 13	4.90 100	91.8 19	5.56 23	25.3 11	7.64 14	28.3 3
21.1	26.90 21	72.6 17	3.98 92	89.5 23	5.36 20	24.0 13	7.52 12	28.2 1
31.1	26.73 17	70.5 21	3.17 81	86.7 28	5.20 16	22.4 16	7.42 10	28.2 0
	13	25	68	31	11	17	6	2
Apr. 10.1	26.60	68.0	2.49	83.6	5.09	20.7	7.36	28.4
20.1	26.52 8	65.2 28	1.95 54	80.3 33	5.05 4	19.0 17	7.34 2	28.7 3
30.0	26.49 3	62.1 31	1.57 38	76.8 35	5.08 3	17.3 17	7.36 2	29.2 5
May 10.0	26.52 3	58.9 32	1.35 22	73.1 37	5.17 9	15.7 16	7.43 7	29.9 7
20.0	26.60 8	55.6 33	1.31 4	69.4 37	5.33 16	14.2 15	7.54 11	30.8 9
	14	34	13	37	23	13	16	11
30.0	26.74	52.2	1.44	65.7	5.56	12.9	7.70	31.9
June 8.9	26.94 20	48.8 34	1.74 30	62.2 35	5.84 28	12.0 9	7.90 20	33.1 12
18.9	27.18 24	45.5 33	2.20 46	58.9 33	6.18 34	11.3 7	8.13 23	34.5 14
28.9	27.46 28	42.5 30	2.81 61	55.9 30	6.56 38	10.9 4	8.40 27	36.0 15
July 8.8	27.78 32	39.7 28	3.55 74	53.2 27	6.97 41	10.9 0	8.69 29	37.5 15
	35	25	85	22	44	4	30	16
18.8	28.13	37.2	4.40	51.0	7.41	11.3 6	8.99	39.1
28.8	28.50 37	35.2 20	5.34 94	49.4 16	7.86 45	11.9 6	9.30 31	40.7 16
Aug. 7.8	28.88 38	33.7 15	6.33 99	48.3 11	8.32 46	12.8 9	9.62 32	42.2 15
	38	10	102	6	45	12	32	14
17.7	29.26 38	32.7 10	7.35 102	47.7 6	8.77 45	14.0 12	9.94 32	43.6 14
27.7	29.63 37	32.2 5	8.37 102	47.8 1	9.21 44	15.4 14	10.24 30	44.8 12
	35	1	99	7	43	17	29	10
Sept. 6.7	29.98	32.3 6	9.36	48.5	9.64	17.1 18	10.53	45.8
16.7	30.31 33	32.9 12	10.27 91	49.8 13	10.04 40	18.9 20	10.80 27	46.7 9
26.6	30.61 30	34.1 12	11.08 81	51.7 19	10.41 37	20.9 21	11.06 26	47.4 7
Oct. 6.6	30.88 27	35.8 17	11.76 68	54.1 24	10.74 33	23.0 21	11.29 23	47.8 4
16.6	31.10 22	37.9 21	12.29 53	56.8 27	11.04 30	25.2 22	11.49 20	48.0 2
	18	25	36	30	26	22	18	0
26.5	31.28	40.4	12.65	59.8	11.30	27.4	11.67	48.0
Nov. 5.5	31.41 13	43.1 27	12.82 17	63.1 33	11.52 22	29.6 22	11.82 15	47.9 1
15.5	31.49 8	45.9 28	12.80 2	66.4 33	11.69 17	31.7 21	11.94 12	47.6 3
25.5	31.53 4	48.8 29	12.59 21	69.7 33	11.81 12	33.8 21	12.03 9	47.2 4
Dec. 5.4	31.52 1	51.6 28	12.19 40	72.7 30	11.87 6	35.8 20	12.09 6	46.7 1
	6	25	57	27	1	17	2	1
15.4	31.46	54.1	11.62	75.4	11.88	37.5	12.11	46.2
25.4	31.36 10	56.4 23	10.90 72	77.7 23	11.84 4	39.0 15	12.10 1	45.7 1
35.4	31.22 14	58.4 20	10.05 85	79.6 19	11.74 10	40.3 13	12.06 4	45.1 1
Sec δ, Tan δ	1.376	-0.945	4.695	-4.587	1.541	+1.173	1.012	+0.153
Mean Place	27 ^s .164	67'' .10	6 ^s .249	83'' .89	6 ^s .259	8'' .55	7 ^s .762	24'' .15
D'ψ <i>a</i> , D _ω <i>a</i>	-0.02	+0.04	-0.09	+0.20	+0.02	-0.05	0.00	-0.01
Dψ δ, D _ω δ	+0.3	+0.8	+0.3	+0.8	+0.3	+0.8	+0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β H. Camelop. Mag. 4.4		ξ Tauri. Mag. 3.8		ζ Tauri. Mag. 4.3		ε Eridani. Mag. 3.8	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 3 21	° ' +59 38	h m 3 22	° ' + 9 25	h m 3 26	° ' +12 38	h m 3 28	° ' - 9 44
	s	"	s	"	s	"	s	"
Jan. 0.4	61.88	35.8	27.87	54.9	4.81	29.4	50.74	65.1
10.3	61.69 ¹⁹	37.3 ¹⁵	27.81 ⁶	54.4 ⁵	4.75 ⁶	29.0 ⁴	50.67 ⁷	66.3 ¹²
20.3	61.44 ²⁵	38.4 ¹¹	27.72 ⁹	53.9 ⁵	4.66 ⁹	28.6 ⁴	50.56 ¹¹	67.2 ⁹
30.3	61.15 ²⁹	39.0 ⁶	27.60 ¹²	53.4 ⁵	4.54 ¹²	28.2 ⁴	50.43 ¹³	67.9 ⁷
Feb. 9.3	60.83 ³²	39.2 ²	27.46 ¹⁴	53.0 ⁴	4.40 ¹⁴	27.8 ⁴	50.29 ¹⁴	68.4 ⁵
19.2	60.49 ³⁴	38.9 ³	27.32 ¹⁴	52.6 ⁴	4.25 ¹⁵	27.4 ⁴	50.13 ¹⁶	68.6 ²
Mar. 1.2	60.16 ³³	38.2 ⁷	27.17 ¹⁵	52.3 ³	4.10 ¹⁵	27.1 ³	49.97 ¹⁶	68.6 ⁰
11.2	59.84 ³²	37.0 ¹²	27.03 ¹⁴	52.1 ²	3.96 ¹⁴	26.8 ³	49.82 ¹⁵	68.3 ³
21.1	59.56 ²⁸	35.4 ¹⁶	26.90 ¹³	52.0 ¹	3.83 ¹³	26.5 ³	49.68 ¹⁴	67.8 ⁵
31.1	59.34 ²²	33.6 ¹⁸	26.80 ¹⁰	52.0 ⁰	3.73 ¹⁰	26.4 ¹	49.57 ¹¹	67.0 ⁸
Apr. 10.1	59.19 ¹⁵	31.6 ²⁰	26.74 ⁶	52.0 ¹	3.66 ⁷	26.4 ⁰	49.49 ⁸	66.0 ¹⁰
20.1	59.11 ⁸	29.5 ²¹	26.71 ³	52.4 ³	3.63 ³	26.5 ¹	49.45 ⁴	64.7 ¹³
30.0	59.12 ¹	27.4 ²¹	26.73 ²	52.9 ⁵	3.65 ²	26.7 ²	49.45 ⁰	63.2 ¹⁵
May 10.0	59.22 ¹⁰	25.3 ²¹	26.80 ⁷	53.5 ⁶	3.72 ⁷	27.1 ⁴	49.49 ⁴	61.5 ¹⁷
20.0	59.40 ¹⁸	23.3 ²⁰	26.91 ¹¹	54.3 ⁸	3.83 ¹¹	27.8 ⁷	49.58 ⁹	59.6 ¹⁹
30.0	59.66 ²⁶	21.6 ¹⁷	27.07 ¹⁶	54.3 ¹⁰	3.98 ¹⁵	28.7 ⁹	49.72 ¹⁴	57.5 ²¹
June 8.9	60.00 ³⁴	20.1 ¹⁵	27.27 ²⁰	55.3 ¹²	3.98 ²⁰	28.7 ¹⁰	49.72 ¹⁸	57.5 ²¹
18.9	60.40 ⁴⁰	18.9 ¹²	27.27 ²⁰	56.5 ¹²	4.18 ²⁰	29.7 ¹⁰	49.90 ¹⁸	55.4 ²¹
28.9	60.40 ⁴⁶	18.9 ⁸	27.50 ²³	57.9 ¹⁴	4.42 ²⁴	30.8 ¹¹	50.11 ²¹	53.2 ²²
July 8.8	61.36 ⁵⁰	18.1 ⁸	27.50 ²⁶	57.9 ¹⁴	4.42 ²⁶	30.8 ¹³	50.11 ²⁴	53.2 ²²
18.8	61.36 ⁵³	17.7 ⁴	27.76 ²⁶	59.3 ¹⁴	4.68 ²⁶	32.1 ¹³	50.35 ²⁴	51.0 ²²
28.8	61.89 ⁵⁶	17.7 ¹	28.05 ²⁹	60.8 ¹⁵	4.97 ²⁹	33.5 ¹⁴	50.62 ²⁷	48.8 ²²
18.8	61.89 ⁵³	17.6 ³	28.36 ³¹	62.4 ¹⁶	5.28 ³¹	35.0 ¹⁵	50.91 ²⁹	46.8 ²⁰
28.8	62.45 ⁵⁶	17.9 ³	28.67 ³¹	63.9 ¹⁵	5.60 ³²	36.4 ¹⁴	51.21 ³⁰	46.8 ¹⁹
Aug. 7.8	63.02 ⁵⁷	18.6 ⁷	28.99 ³²	65.4 ¹⁵	5.92 ³²	37.8 ¹⁴	51.52 ³¹	44.9 ¹⁹
17.7	63.58 ⁵⁶	19.6 ¹⁰	29.31 ³²	66.8 ¹⁴	6.24 ³²	39.2 ¹⁴	51.82 ³¹	43.3 ¹⁶
27.7	64.13 ⁵⁵	21.0 ¹⁴	29.61 ³⁰	68.0 ¹²	6.55 ³¹	40.5 ¹³	52.12 ³⁰	41.9 ¹⁴
Sept. 6.7	64.66 ⁵³	22.7 ¹⁷	29.90 ²⁹	68.0 ¹⁰	6.85 ³⁰	41.6 ¹¹	52.41 ²⁹	40.9 ⁷
16.7	65.16 ⁵⁰	22.7 ¹⁹	29.90 ²⁸	69.0 ⁹	6.85 ²⁸	41.6 ⁹	52.41 ²⁷	40.2 ³
26.6	65.16 ⁴⁶	24.6 ²²	30.18 ²⁶	69.9 ⁷	7.13 ²⁶	42.5 ⁷	52.68 ²⁵	39.9 ¹
Oct. 6.6	65.62 ⁴²	26.8 ²³	30.44 ²³	70.6 ⁵	7.39 ²⁴	43.2 ⁶	52.93 ²³	40.0 ⁴
16.6	66.04 ³⁸	29.1 ²⁵	30.67 ²¹	71.1 ²	7.63 ²¹	43.8 ⁴	53.16 ²⁰	40.4 ⁷
26.5	66.42 ³³	31.6 ²⁶	30.88 ¹⁸	71.3 ⁰	7.84 ¹⁹	44.2 ²	53.36 ¹⁷	41.1 ¹⁰
Nov. 5.5	66.75 ²⁷	34.2 ²⁶	31.06 ¹⁵	71.3 ¹	8.03 ¹⁶	44.4 ¹	53.53 ¹⁵	42.1 ¹²
15.5	67.02 ²⁰	36.8 ²⁷	31.21 ¹³	71.2 ²	8.19 ¹³	44.5 ⁰	53.68 ¹¹	43.3 ¹⁴
25.5	67.22 ¹⁴	39.5 ²⁶	31.34 ⁹	71.0 ⁴	8.32 ¹⁰	44.5 ²	53.79 ⁸	44.7 ¹⁵
Dec. 5.4	67.36 ⁷	42.1 ²⁴	31.43 ⁶	70.6 ⁵	8.42 ⁶	44.3 ²	53.87 ⁵	46.2 ¹⁶
15.4	67.43 ⁰	44.5 ²³	31.49 ²	70.2 ⁵	8.48 ³	44.1 ³	53.92 ²	47.8 ¹⁵
25.4	67.43 ⁸	46.8 ²⁰	31.51 ¹	69.7 ⁵	8.51 ⁰	43.8 ⁴	53.94 ²	49.3 ¹⁴
35.4	67.35 ¹⁵	48.8 ¹⁷	31.50 ⁴	69.2 ⁵	8.51 ⁴	43.4 ⁴	53.92 ⁶	50.7 ¹²
Sec δ, Tan δ	1.978	+1.707	1.014	+0.166	1.025	+0.224	1.015	-0.172
Mean Place	60°.890	17''.18	27°.134	47''.63	4°.068	21''.23	49°.841	67''.42
D'ψ α, Dω α	+0.03	-0.07	0.00	-0.01	0.00	-0.01	0.00	+0.01
Dψ δ, Dω δ	+0.3	+0.8	+0.3	+0.8	+0.2	+0.8	+0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ^5 Eridani. Mag. 4.3		δ Persei. Mag. 3.1		δ Eridani. Mag. 3.7		ν Persei. Mag. 3.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 3 29 s	° ' " -21 54 "	h m 3 36 s	° ' " +47 30 "	h m 3 39 s	° ' " -10 2 "	h m 3 39 s	° ' " +42 18 "
Jan. 0.4	57.66	87.6	44.37	53.1	5.75	84.1	17.58	31.9
10.3	57.57 9	89.1 15	44.27 10	54.2 11	5.68 7	85.3 12	17.50 8	32.8 9
20.3	57.45 12	90.3 12	44.12 15	55.0 8	5.58 10	86.3 10	17.37 13	33.4 6
30.3	57.30 15	91.1 8	43.93 19	55.5 5	5.45 13	87.0 7	17.20 17	33.8 4
Feb. 9.3	57.14 16	91.6 5	43.71 22	55.6 1	5.31 14	87.5 5	17.01 19	33.9 1
	17	1	23	2	15	3	21	3
19.2	56.97	91.7	43.48	55.4	5.16	87.8	16.80	33.6
Mar. 1.2	56.79 18	91.5 2	43.24 24	54.8 6	5.00 16	87.8 0	16.59 21	33.0 6
	17	6	23	9	16	3	21	8
11.2	56.62	90.9	43.01	53.9	4.84 16	87.5 3	16.38 21	32.2 10
21.2	56.46 16	90.0 9	42.81 20	52.7 12	4.70 14	87.0 5	16.20 18	31.2 10
31.1	56.33 13	88.8 12	42.64 17	51.3 14	4.58 12	86.2 8	16.05 15	30.0 12
	9	16	12	15	9	10	11	13
Apr. 10.1	56.24	87.2	42.52	49.8	4.49	85.2	15.94	28.7
20.1	56.18 6	85.3 19	42.46 6	48.2 16	4.44 5	83.9 13	15.88 6	27.3 14
30.0	56.17 1	83.2 21	42.46 0	46.6 16	4.43 1	82.4 15	15.88 0	26.0 13
May 10.0	56.20 3	80.9 23	42.53 7	45.1 15	4.47 4	80.7 17	15.94 6	24.7 13
20.0	56.28 8	78.4 25	42.66 13	43.7 14	4.55 8	78.8 19	16.07 13	23.6 11
	13	26	20	12	12	21	18	10
30.0	56.41	75.8	42.86	42.5	4.67	76.7	16.25	22.6
June 8.9	56.59 18	73.1 27	43.11 25	41.5 10	4.84 17	74.5 22	16.49 24	21.9 7
18.9	56.80 21	70.4 27	43.42 31	40.8 7	5.05 21	72.3 22	16.78 29	21.4 5
28.9	57.04 24	67.8 26	43.77 35	40.4 4	5.29 24	70.1 22	17.10 32	21.2 2
July 8.9	57.31 27	65.3 25	44.16 39	40.2 2	5.56 27	67.9 22	17.46 36	21.3 1
	30	22	42	2	28	21	39	3
18.8	57.61	63.1	44.58	40.4	5.84	65.8	17.85	21.6
28.8	57.92 31	61.1 20	45.01 43	40.9 5	6.14 30	63.9 19	18.25 40	22.2 6
Aug. 7.8	58.24 32	59.4 17	45.45 44	41.6 7	6.45 31	62.3 16	18.65 40	23.0 8
	31	13	44	10	31	14	41	10
17.7	58.55	58.1	45.89	42.6	6.76 31	60.9 14	19.06 41	24.0 12
27.7	58.86 31	57.2 9	46.32 43	43.8 12	7.06 30	59.9 10	19.46 40	25.2 12
	30	4	42	14	29	7	39	14
Sept. 6.7	59.16	56.8	46.74	45.2	7.35	59.2	19.85	26.6
16.7	59.44 28	56.8 0	47.14 40	46.8 16	7.62 27	58.9 3	20.22 37	28.1 15
26.6	59.70 26	57.3 5	47.52 38	48.5 17	7.88 26	58.9 0	20.57 35	29.7 16
Oct. 6.6	59.93 23	58.2 9	47.87 35	50.4 19	8.12 24	59.3 4	20.89 32	31.4 17
16.6	60.14 21	59.5 13	48.18 31	52.3 19	8.33 21	60.0 7	21.19 30	33.1 17
	18	16	28	20	18	10	26	17
26.6	60.32	61.1	48.46	54.3	8.51	61.0	21.45	34.8
Nov. 5.5	60.46 14	63.0 19	48.70 24	56.3 20	8.67 16	62.3 13	21.67 22	36.5 17
15.5	60.57 11	65.0 20	48.89 19	58.3 20	8.80 13	63.7 14	21.86 19	38.2 17
25.5	60.64 7	67.1 21	49.03 14	60.2 19	8.89 9	65.2 15	22.00 14	39.8 16
Dec. 5.4	60.68 4	69.2 21	49.13 10	62.0 18	8.95 6	66.8 16	22.09 9	41.3 15
	0	20	4	17	2	15	5	14
15.4	60.68	71.2	49.17	63.7	8.97	68.3	22.14	42.7
25.4	60.64 4	73.1 19	49.15 2	65.2 15	8.96 1	69.7 14	22.14 0	43.9 12
35.4	60.57 7	74.8 17	49.08 7	66.5 13	8.92 4	71.0 13	22.08 6	45.0 11
Sec δ , Tan δ	1.078	-0.402	1.480	+1.092	1.016	-0.177	1.352	+0.910
Mean Place	56°.609	87''.08	43°.465	36''.93	4°.802	86''.71	16°.710	16''.78
D' ψ α , D ω α	-0.01	+0.02	+0.02	-0.04	0.00	+0.01	+0.02	-0.04
D' ψ δ , D ω δ	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	5 H. Camelop. Mag. 4.7			η Tauri. Mag. 3.0			τ ⁶ Eridani. Mag. 4.3			γ Eridani. Mag. 4.2		
	Right Ascension.		Declination N.	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination S.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	3	41	+71 3	3	42	+23 50	3	43	-23 29	3	46	-36 27
	s		"	s		"	s		"	s		"
Jan. 0.4	11.18		74.7	19.40		23.6	7.40		80.1	13.34		49.6
10.3	10.87	31	76.8	19.35	5	23.7	7.31	9	81.7	13.22	12	51.5
20.3	10.47	40	78.4	19.26	9	23.7	7.19	12	83.0	13.06	16	53.0
30.3	9.99	48	79.5	19.14	12	23.6	7.04	15	84.0	12.87	19	54.1
Feb. 9.3	9.45	54	80.1	18.99	15	23.4	6.88	16	84.6	12.66	21	54.7
		57			16			18			22	
19.2	8.88		80.2	18.83		23.1	6.70		84.8	12.44		54.8
Mar. 1.2	8.31	57	79.7	18.67	16	22.7	6.51	19	84.7	12.21	23	54.5
11.2	7.77	54	78.7	18.51	16	22.2	6.33	18	84.2	11.99	22	53.7
21.2	7.28	49	77.2	18.36	15	21.6	6.17	16	83.3	11.78	21	52.5
31.1	6.86	42	75.4	18.24	12	21.0	6.03	14	82.1	11.60	18	50.9
		32			8			11			14	
Apr. 10.1	6.54		73.2	18.16		20.5	5.92		80.5	11.46		48.9
20.1	6.34	20	70.8	18.12	4	20.0	5.84	8	78.7	11.36	10	46.5
30.0	6.27	7	68.3	18.12	0	19.7	5.81	3	76.6	11.30	6	43.9
May 10.0	6.33	6	65.7	18.17	5	19.5	5.83	2	74.2	11.29	1	41.0
20.0	6.51	18	63.2	18.28	11	19.4	5.90	7	71.7	11.34	5	38.0
		31			15			11			10	
30.0	6.82		60.9	18.43		19.5	6.01		69.1	11.44		34.9
June 8.9	7.25	43	58.8	18.63	20	19.8	6.17	16	66.4	11.59	15	31.7
18.9	7.78	53	57.0	18.87	24	20.3	6.37	20	63.7	11.78	19	28.5
28.9	8.41	63	55.6	19.14	27	21.0	6.60	23	61.0	12.02	24	25.5
July 8.9	9.11	70	54.5	19.44	30	21.8	6.87	27	58.5	12.30	28	22.7
		76			32			29			30	
18.8	9.87		53.8	19.76		22.8	7.16		56.2	12.60		20.2
28.8	10.67	80	53.5	20.09	33	23.9	7.46	30	54.1	12.92	32	18.0
Aug. 7.8	11.50	83	53.7	20.43	34	25.0	7.77	31	52.4	13.26	34	16.2
17.7	12.34	84	54.3	20.77	34	26.2	8.09	32	51.1	13.60	34	14.9
27.7	13.17	83	55.3	21.10	33	27.4	8.40	31	50.2	13.94	34	14.1
		81			33			30			33	
Sept. 6.7	13.98		56.7	21.43		28.5	8.70		49.7	14.27		13.9
16.7	14.76	78	58.5	21.74	31	29.6	8.99	29	49.7	14.59	32	14.2
26.6	15.50	74	60.6	22.03	29	30.7	9.26	27	50.2	14.88	29	15.0
Oct. 6.6	16.18	68	62.9	22.30	27	31.7	9.50	24	51.2	15.15	27	16.4
16.6	16.79	61	65.5	22.54	24	32.5	9.72	22	52.5	15.38	23	18.2
		52			22			19			20	
26.6	17.31		68.3	22.76		33.3	9.91		54.2	15.58		20.4
Nov. 5.5	17.74	43	71.3	22.95	19	34.0	10.06	15	56.2	15.74	16	22.9
15.5	18.08	34	74.3	23.11	16	34.5	10.18	12	58.3	15.86	12	25.5
25.5	18.31	23	77.4	23.23	12	35.0	10.27	9	60.5	15.93	7	28.3
Dec. 5.4	18.43	12	80.4	23.32	9	35.4	10.32	5	62.8	15.96	3	31.1
		0			5			1			1	
15.4	18.43		83.2	23.37		35.8	10.33		65.0	15.95		33.7
25.4	18.30	13	85.8	23.38	1	36.0	10.30	3	67.0	15.89	6	36.1
35.4	18.06	24	88.1	23.35	3	36.1	10.24	6	68.8	15.79	10	38.2
Sec δ, Tan δ	3.082		+2.916	1.093		+0.442	1.090		-0.435	1.243		-0.739
Mean Place	9 ^h .325		55 ^{''} .17	18 ^h .596		12 ^{''} .62	6 ^h .272		79 ^{''} .84	11 ^h .944		46 ^{''} .95
D ₁ α, D ₂ α	+0.06		-0.11	+0.01		-0.02	-0.01		+0.02	-0.02		+0.03
D ₁ δ, D ₂ δ	+0.2		+0.8	+0.2		+0.8	+0.2		+0.8	+0.2		+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Hydri. Mag. 3.2		ζ Persei. Mag. 2.9		θ H. Camelop. Mag. 5.2		ε Persei. Mag. 3.0	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 3 48 s	° ' " -74 29 "	h m 3 48 s	° ' " +31 37 "	h m 3 49 s	° ' " +60 51 "	h m 3 52 s	° ' " +39 45 "
Jan. 0.4	39.30 66	87.7 20	40.43 5	46.6 5	43.91 16	36.1 17	1.65 7	48.2 9
10.4	38.64 74	89.7 14	40.38 10	47.1 3	43.75 22	37.8 14	1.58 11	49.1 6
20.3	37.90 81	91.1 9	40.28 13	47.4 1	43.53 28	39.2 10	1.47 15	49.7 4
30.3	37.09 86	92.0 3	40.15 16	47.5 1	43.25 33	40.2 5	1.32 18	50.1 1
Feb. 9.3	36.23 88	92.3 3	39.99 17	47.4 3	42.92 35	40.7 0	1.14 20	50.2 2
19.2	35.35 87	92.0 8	39.82 18	47.1 4	42.57 36	40.7 4	0.94 21	50.0 4
Mar. 1.2	34.48 84	91.2 14	39.64 18	46.7 6	42.21 35	40.3 9	0.73 20	49.6 7
11.2	33.64 79	89.8 19	39.46 16	46.1 7	41.86 32	39.4 13	0.53 18	48.9 9
21.2	32.85 72	87.9 24	39.30 13	45.4 8	41.54 27	38.1 16	0.35 15	48.0 10
31.1	32.13 62	85.5 27	39.17 10	44.6 9	41.27 20	36.5 19	0.20 11	47.0 12
Apr. 10.1	31.51 52	82.8 31	39.07 5	43.7 8	41.07 13	34.6 20	0.09 7	45.8 12
20.1	30.99 40	79.7 33	39.02 0	42.9 8	40.94 4	32.6 21	0.02 1	44.6 12
30.1	30.59 26	76.4 35	39.02 5	42.1 7	40.90 5	30.5 22	0.01 5	43.4 11
May 10.0	30.33 13	72.9 36	39.07 10	41.4 5	40.95 14	28.3 21	0.06 10	42.3 10
20.0	30.20 1	69.3 37	39.17 15	40.9 3	41.09 22	26.2 19	0.16 16	41.3 8
30.0	30.21 15	65.6 36	39.32 21	40.6 2	41.31 30	24.3 17	0.32 22	40.5 7
June 8.9	30.36 29	62.0 35	39.53 25	40.4 0	41.61 38	22.6 14	0.54 27	39.8 4
18.9	30.65 42	58.5 32	39.78 28	40.4 2	41.99 44	21.2 12	0.81 30	39.4 2
28.9	31.07 53	55.3 29	40.06 31	40.6 5	42.43 49	20.0 8	1.11 34	39.2 1
July 8.9	31.60 63	52.4 25	40.37 34	41.1 6	42.92 53	19.2 4	1.45 37	39.3 3
18.8	32.23 72	49.9 21	40.71 36	41.7 8	43.45 56	18.8 1	1.82 38	39.6 5
28.8	32.95 78	47.8 15	41.07 36	42.5 9	44.01 58	18.7 3	2.20 39	40.1 7
Aug. 7.8	33.73 81	46.3 10	41.43 36	43.4 11	44.59 58	19.0 6	2.59 40	40.8 9
17.8	34.54 83	45.3 3	41.79 35	44.5 11	45.17 58	19.6 10	2.99 39	41.7 11
27.7	35.37 82	45.0 3	42.14 35	45.6 12	45.75 57	20.6 13	3.38 38	42.8 12
Sept. 6.7	36.19 78	45.3 9	42.49 33	46.8 13	46.32 55	21.9 15	3.76 37	44.0 13
16.7	36.97 72	46.2 15	42.82 32	48.1 12	46.87 52	23.4 18	4.13 35	45.3 14
26.6	37.69 63	47.7 21	43.14 29	49.3 12	47.39 48	25.2 21	4.48 32	46.7 15
Oct. 6.6	38.32 53	49.8 25	43.43 27	50.5 12	47.87 44	27.3 23	4.80 30	48.2 15
16.6	38.85 40	52.3 29	43.70 24	51.7 11	48.31 39	29.6 24	5.10 26	49.7 15
26.6	39.25 26	55.2 32	43.94 21	52.8 11	48.70 33	32.0 25	5.36 23	51.2 15
Nov. 5.5	39.51 11	58.4 33	44.15 18	53.9 10	49.03 27	34.5 26	5.59 20	52.7 15
15.5	39.62 4	61.7 34	44.33 14	54.9 9	49.30 20	37.1 25	5.79 16	54.2 14
25.5	39.58 20	65.1 30	44.47 6	55.8 8	49.50 12	39.6 24	5.95 11	55.6 14
Dec. 5.5	39.38 34	68.4 23	44.57 3	56.7 5	49.62 5	42.1 20	6.06 6	57.0 12
15.4	39.04 47	71.4 27	44.63 1	57.5 7	49.67 3	44.5 22	6.12 1	58.2 11
25.4	38.57 59	74.1 23	44.64 3	58.2 5	49.64 11	46.7 20	6.13 4	59.3 10
35.4	37.98	76.4	44.61	58.7	49.53	48.7	6.09	60.3
Sec δ, Tan δ	3.743	-3.607	1.174	+0.616	2.053	+1.793	1.301	+0.832
Mean Place	34°.375	80''.92	39°.574	33''.85	42°.558	18''.09	0°.709	33''.88
D'ψ α, Dω α	-0.08	+0.13	+0.01	-0.02	+0.04	-0.06	+0.02	-0.03
Dψ δ, Dω δ	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8	+0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Persei. Mag. 4.0		γ Eridani. Mag. 3.2		λ Tauri. Var. 3.3-4.2		δ Reticuli. Mag. 4.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 3 53 s	° ' +35 32 "	h m 3 53 s	° ' -13 44 "	h m 3 55 s	° ' +12 14 "	h m 3 57 s	° ' -61 38 "
Jan. 0.4	19.90	43.1	59.23	77.0	52.40	51.2	24.50	48.5
10.4	19.84 6	43.8 7	59.17 6	78.4 14	52.36 4	50.9 3	24.20 30	50.7 22
20.3	19.74 10	44.3 5	59.07 10	79.6 12	52.28 8	50.5 4	23.84 36	52.4 17
30.3	19.61 13	44.6 3	58.95 12	80.5 9	52.17 11	50.1 4	23.44 40	53.5 11
Feb. 9.3	19.44 17	44.6 0	58.80 15	81.1 6	52.04 13	49.7 4	23.01 43	54.1 6
	19.44 19	44.6 2	58.80 16	81.1 4	52.04 15	49.7 3	23.01 45	54.1 0
19.2	19.25	44.4	58.64	81.5	51.89	49.4	22.56	54.1
Mar. 1.2	19.06 19	44.0 4	58.47 17	81.6 1	51.73 16	49.1 3	22.10 46	53.6 5
11.2	18.87 19	43.4 6	58.30 17	81.3 3	51.58 15	48.9 2	21.65 45	52.5 11
21.2	18.70 17	42.6 8	58.15 15	80.7 6	51.44 14	48.7 2	21.23 42	50.9 16
31.1	18.56 14	41.7 9	58.02 13	79.9 8	51.32 12	48.6 1	20.85 38	48.8 21
	18.56 11	41.7 10	58.02 10	79.9 11	51.32 9	48.6 0	20.85 33	48.8 25
Apr. 10.1	18.45	40.7	57.92	78.8	51.23	48.6	20.52	46.3
20.1	18.39 6	39.7 10	57.85 7	77.4 14	51.17 6	48.7 1	20.25 27	43.4 29
30.1	18.38 1	38.7 10	57.82 3	75.8 16	51.16 1	49.0 3	20.05 20	40.3 31
May 10.0	18.42 4	37.8 9	57.84 2	74.0 18	51.20 4	49.4 4	19.93 12	36.9 34
20.0	18.52 10	37.0 8	57.91 7	71.9 21	51.28 8	50.0 6	19.89 4	33.3 36
	18.52 16	37.0 6	57.91 11	71.9 22	51.28 13	50.0 7	19.89 4	33.3 36
30.0	18.68	36.4	58.02	69.7	51.41	50.7	19.93	29.7
June 8.9	18.89 21	36.0 4	58.17 15	67.4 23	51.58 17	51.6 9	20.06 13	26.1 36
18.9	19.14 25	35.8 2	58.36 19	65.1 23	51.79 21	52.7 11	20.27 21	22.6 35
28.9	19.43 29	35.8 0	58.59 23	62.8 23	52.04 25	53.9 12	20.54 27	19.3 33
July 8.9	19.75 32	36.0 2	58.84 25	60.5 23	52.31 27	55.2 13	20.88 34	16.2 31
	19.75 35	36.0 5	58.84 28	60.5 21	52.31 29	55.2 13	20.88 40	16.2 27
18.8	20.10	36.5	59.12	58.4	52.60	56.5	21.28	13.5
28.8	20.47 37	37.1 6	59.42 30	56.5 19	52.91 31	57.8 13	21.73 45	11.2 23
Aug. 7.8	20.84 37	37.9 8	59.72 30	54.8 17	53.23 32	59.1 13	22.21 48	9.5 17
17.8	21.22 38	38.9 10	60.03 31	53.4 14	53.55 32	60.3 12	22.71 50	8.3 12
27.7	21.59 37	40.0 11	60.33 30	52.4 10	53.86 31	61.4 11	23.21 50	7.7 6
	21.59 36	40.0 12	60.33 30	52.4 7	53.86 30	61.4 10	23.21 50	7.7 0
Sept. 6.7	21.95	41.2	60.63	51.7	54.16	62.4	23.71	7.7
16.7	22.30 35	42.4 12	60.91 28	51.5 2	54.46 30	63.2 8	24.19 48	8.4 7
26.6	22.63 33	43.7 13	61.18 27	51.7 2	54.74 28	63.8 6	24.63 44	9.7 13
Oct. 6.6	22.94 31	45.0 13	61.43 25	52.2 5	55.00 26	64.2 4	25.03 40	11.5 18
16.6	23.22 28	46.3 13	61.65 22	53.1 9	55.24 24	64.5 3	25.38 35	13.8 23
	23.22 26	46.3 13	61.65 20	53.1 12	55.24 21	64.5 1	25.38 28	13.8 28
26.6	23.48	47.6	61.85	54.3	55.45	64.6	25.66	16.6
Nov. 5.5	23.70 22	48.9 13	62.02 17	55.8 15	55.64 19	64.5 1	25.86 20	19.7 31
15.5	23.89 19	50.1 12	62.16 14	57.5 17	55.80 16	64.3 2	25.99 13	23.0 33
25.5	24.04 15	51.3 12	62.26 10	59.3 18	55.93 13	64.0 3	26.04 5	26.4 34
Dec. 5.5	24.15 11	52.4 11	62.33 7	61.1 18	56.02 9	63.7 3	26.01 3	29.7 33
	24.15 7	52.4 10	62.33 3	61.1 18	56.02 6	63.7 4	26.01 12	29.7 31
15.4	24.22	53.4	62.36	62.9	56.08	63.3	25.89	32.8
25.4	24.24 2	54.3 9	62.36 0	64.6 17	56.10 2	62.9 4	25.70 19	35.6 28
35.4	24.21 3	55.0 7	62.32 4	66.1 15	56.08 2	62.5 4	25.44 26	38.1 25
Sec δ, Tan δ	1.229	+0.715	1.030	-0.245	1.023	+0.217	2.105	-1.853
Mean Place	18°.983	29''.67	58°.196	79''.36	51°.516	42''.92	21°.805	43''.24
D'φ α, Dα α	+0.02	-0.03	-0.01	+0.01	0.00	-0.01	-0.04	+0.06
Dφ δ, Dα δ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Tauri. Mag. 3.9		α Tauri. Mag. 4.5		ε Persei. Mag. 4.0		δ Tauri. Mag. 5.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 3 58 s	° ' " + 5 44 "	h m 3 59 s	° ' " +21 50 "	h m 4 2 s	° ' " +47 28 "	h m 4 5 s	° ' " +26 15 "
Jan. 0.4	32.53	61.9	33.86	52.5	21.57	67.7	32.72	28.3
10.4	32.49 4	61.2 7	33.82 4	52.5 0	21.49 8	68.9 12	32.68 4	28.5 2
20.3	32.42 7	60.6 6	33.74 8	52.5 0	21.37 12	69.9 10	32.60 8	28.7 2
30.3	32.31 11	60.1 5	33.63 11	52.4 1	21.20 17	70.6 7	32.48 12	28.7 0
Feb. 9.3	32.18 13 15	59.7 4 4	33.49 14 16	52.2 2 3	20.99 21 23	70.9 3 0	32.34 14 16	28.6 1 2
19.3	32.03 16	59.3 3	33.33 16	51.9 3	20.76 24	70.9 3	32.18 17	28.4 3
Mar. 1.2	31.87 15	59.0 1	33.17 16	51.6 4	20.52 24	70.6 6	32.01 17	28.1 4
11.2	31.72 14	58.9 0	33.01 15	51.2 4	20.28 23	70.0 10	31.84 16	27.7 5
21.2	31.58 12	58.9 1	32.86 13	50.8 4	20.05 19	69.0 12	31.68 14	27.2 6
31.1	31.46 9	59.0 3	32.73 10	50.4 4	19.86 14	67.8 13	31.54 11	26.6 6
Apr. 10.1	31.37 6	59.3 5	32.63 6	50.0 4	19.72 9	66.5 15	31.43 6	26.0 5
20.1	31.31 2	59.8 6	32.57 1	49.6 3	19.63 3	65.0 16	31.37 2	25.5 5
30.1	31.29 3	60.4 8	32.56 4	49.3 1	19.60 3	63.4 15	31.35 3	25.0 4
May 10.0	31.32 8 12	61.2 9 11	32.60 9 13	49.2 0 2	19.63 10 16	61.9 15 13	31.38 9 13	24.6 3 1
30.0	31.52 16	63.2 13	32.82 18	49.4 3	19.89 23	59.1 11	31.60 18	24.2 1
June 9.0	31.68 20	64.5 14	33.00 22	49.7 5	20.12 28	58.0 9	31.78 22	24.3 3
18.9	31.88 24	65.9 15	33.22 25	50.2 7	20.40 33	57.1 6	32.00 26	24.6 4
28.9	32.12 26	67.4 15	33.47 29	50.9 8	20.73 37	56.5 4	32.26 29	25.0 5
July 8.9	32.38 29	68.9 15	33.76 31	51.7 10	21.10 40	56.1 1	32.55 32	25.5 7
18.8	32.67 30	70.4 15	34.07 32	52.7 10	21.50 42	56.0 2	32.87 33	26.2 9
28.8	32.97 30	71.9 14	34.39 33	53.7 10	21.92 43	56.2 4	33.20 34	27.1 9
Aug. 7.8	33.27 31	73.3 13	34.72 34	54.7 11	22.35 44	56.6 7	33.54 34	28.0 10
17.8	33.58 31	74.6 11	35.06 33	55.8 11	22.79 44	57.3 9	33.88 34	29.0 10
27.7	33.89 30	75.7 9	35.39 32	56.9 10	23.23 43	58.2 11	34.22 34	30.0 10
Sept. 6.7	34.19 29	76.6 6	35.71 31	57.9 9	23.66 42	59.3 13	34.56 32	31.0 10
16.7	34.48 27	77.2 4	36.02 30	58.8 9	24.08 40	60.6 14	34.88 31	32.0 9
26.7	34.75 26	77.6 2	36.32 28	59.7 8	24.48 37	62.0 16	35.19 29	32.9 9
Oct. 6.6	35.01 23	77.8 0	36.60 25	60.5 7	24.85 31	63.6 17	35.48 27	33.8 8
16.6	35.24 21	77.8 3	36.85 23	61.2 6	25.19 31	65.3 18	35.75 25	34.6 8
26.6	35.45 19	77.5 4	37.08 21	61.8 4	25.50 28	67.1 18	36.00 22	35.4 7
Nov. 5.5	35.64 16	77.1 6	37.29 17	62.2 4	25.78 23	68.9 19	36.22 18	36.1 6
15.5	35.80 12	76.5 7	37.46 14	62.6 3	26.01 18	70.8 18	36.40 15	36.7 6
25.5	35.92 9	75.8 7	37.60 11	62.9 3	26.19 13	72.6 18	36.55 12	37.3 5
Dec. 5.5	36.01 6	75.1 8	37.71 7	63.2 2	26.32 8	74.4 17	36.67 8	37.8 4
15.4	36.07 2	74.3 8	37.78 2	63.4 1	26.40 2	76.1 15	36.75 3	38.2 4
25.4	36.09 2	73.5 7	37.80 1	63.5 1	26.42 4	77.6 14	36.78 1	38.6 3
35.4	36.07	72.8	37.79	63.6	26.38	79.0	36.77	38.9
Sec δ, Tan δ	1.005	+0.101	1.077	+0.401	1.480	+1.091	1.115	+0.493
Mean Place	31°.622	55''.03	32°.966	42''.00	20°.456	52''.18	31°.781	16''.88
D'ψ α, Dω α	0.00	0.00	+0.01	-0.01	+0.03	-0.04	+0.01	-0.02
Dψ δ, Dω δ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♄ Eridani. Mag. 4.1		μ Tauri. Mag. 4.3		α Horologii. Mag. 3.8		α Reticuli. Mag. 3.4	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 4 7 s	° ' - 7 3 "	h m 4 10 s	° ' + 8 40 "	h m 4 11 s	° ' - 42 29 "	h m 4 13 s	° ' - 62 40 "
Jan. 0.4	38.10	45.1	49.47	38.4	8.77	93.5	20.88	93.2
10.4	38.05 5	46.3 12	49.44 3	37.8 6	8.64 13	95.7 22	20.58 30	95.5 23
20.3	37.97 8	47.4 11	49.37 7	37.3 5	8.47 17	97.5 18	20.22 36	97.4 19
30.3	37.86 11	48.2 8	49.27 10	36.9 4	8.27 20	98.8 13	19.81 41	98.8 14
Feb. 9.3	37.72 14	48.8 6	49.15 12	36.5 4	8.03 24	99.7 9	19.36 45	99.6 8
	15	4	15	3	26	4	47	2
19.3	37.57 16	49.2 2	49.00 16	36.2 3	7.77 27	100.1 1	18.89 49	99.8 3
Mar. 1.2	37.41 16	49.4 1	48.84 16	35.9 2	7.50 26	100.0 6	18.40 48	99.5 8
11.2	37.25 15	49.3 3	48.68 15	35.7 1	7.24 25	99.4 11	17.92 45	98.7 14
21.2	37.10 13	49.0 6	48.53 13	35.6 0	6.99 22	98.3 15	17.47 42	97.3 19
31.2	36.97 11	48.4 8	48.40 10	35.6 2	6.77 19	96.8 20	17.05 37	95.4 23
Apr. 10.1	36.86 7	47.6 10	48.30 6	35.8 3	6.58 15	94.8 23	16.68 31	93.1 27
20.1	36.79 3	46.6 12	48.24 2	36.1 4	6.43 11	92.5 27	16.37 24	90.4 31
30.1	36.76 1	45.4 15	48.22 2	36.5 6	6.32 5	89.8 29	16.13 16	87.3 33
May 10.0	36.77 5	43.9 17	48.24 6	37.1 8	6.27 1	86.9 31	15.97 8	84.0 34
20.0	36.82 10	42.2 18	48.30 11	37.9 9	6.28 6	83.8 32	15.89 1	80.6 36
30.0	36.92 15	40.4 19	48.41 16	38.8 10	6.34 11	80.6 33	15.90 9	77.0 36
June 9.0	37.07 18	38.5 20	48.57 19	39.8 12	6.45 17	77.3 33	15.99 18	73.4 36
18.9	37.25 22	36.5 21	48.76 23	41.0 13	6.62 22	74.0 32	16.17 25	69.8 34
28.9	37.47 25	34.4 20	48.99 26	42.3 14	6.84 26	70.8 30	16.42 32	66.4 31
July 8.9	37.72 27	32.4 19	49.25 28	43.7 14	7.10 29	67.8 27	16.74 38	63.3 28
18.9	37.99 29	30.5 18	49.53 30	45.1 13	7.39 32	65.1 24	17.12 44	60.5 24
28.8	38.28 30	28.7 16	49.83 31	46.4 13	7.71 34	62.7 19	17.56 48	58.1 19
Aug. 7.8	38.58 30	27.1 13	50.14 31	47.7 12	8.05 36	60.8 14	18.04 50	56.2 14
17.8	38.88 30	25.8 11	50.45 31	48.9 10	8.41 36	59.4 9	18.54 52	54.8 8
27.7	39.18 30	24.7 8	50.76 30	49.9 9	8.77 36	58.5 4	19.06 52	54.0 1
Sept. 6.7	39.48 29	23.9 4	51.06 30	50.8 7	9.13 34	58.1 2	19.58 50	53.9 5
16.7	39.77 27	23.5 0	51.36 28	51.5 5	9.47 33	58.3 8	20.08 47	54.4 11
26.7	40.04 25	23.5 3	51.64 26	52.0 2	9.80 30	59.1 14	20.55 43	55.5 17
Oct. 6.6	40.29 24	23.8 6	51.90 25	52.2 0	10.10 27	60.5 19	20.98 38	57.2 23
16.6	40.53 21	24.4 9	52.15 23	52.2 1	10.37 23	62.4 23	21.36 31	59.5 27
26.6	40.74 18	25.3 12	52.38 20	52.1 3	10.60 19	64.7 27	21.67 24	62.2 30
Nov. 5.6	40.92 16	26.5 14	52.58 17	51.8 5	10.79 15	67.4 29	21.91 16	65.2 33
15.5	41.08 12	27.9 14	52.75 14	51.3 6	10.94 10	70.3 30	22.07 8	68.5 34
25.5	41.20 9	29.3 15	52.89 10	50.7 6	11.04 5	73.3 30	22.15 1	71.9 34
Dec. 5.5	41.29 5	30.8 15	52.99 7	50.1 6	11.09 0	76.3 30	22.14 9	75.3 32
15.4	41.34 2	32.3 15	53.06 3	49.5 6	11.09 5	79.3 28	22.05 18	78.5 30
25.4	41.36 2	33.8 13	53.09 0	48.9 6	11.04 10	82.1 24	21.87 25	81.5 27
35.4	41.34	35.1	53.09	48.3	10.94	84.5	21.62	84.2
Sec δ, Tan δ	1.008	-0.124	1.012	+0.153	1.356	-0.917	2.180	-1.937
Mean Place	37°.080	49''.33	48°.522	30''.76	7°.122	91''.44	18°.011	89''.16
D ₁ α, D ₂ α	0.00	0.00	0.00	0.00	-0.02	+0.03	-0.05	+0.06
D ₁ δ, D ₂ δ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Tauri. Mag. 3.9		δ Tauri. Mag. 3.9		ν^5 Eridani. Mag. 4.1		ϵ Tauri. Mag. 3.6	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 4 14 s	° ' " +15 25 "	h m 4 17 s	° ' " +17 20 "	h m 4 20 s	° ' " -34 12 "	h m 4 23 s	° ' " +18 59 "
Jan. 0.4	51.39	15.0	55.90	30.8	47.57	66.6	33.08	27.6
10.4	51.36 3	14.8 2	55.88 2	30.6 2	47.48 9	68.7 21	33.06 2	27.6 0
20.3	51.30 6	14.6 2	55.82 6	30.4 2	47.35 13	70.5 18	33.00 6	27.5 1
30.3	51.20 10	14.3 3	55.72 10	30.2 2	47.19 16	71.9 14	32.90 10	27.3 2
Feb. 9.3	51.07 13	14.0 3	55.59 13	30.0 2	47.00 19	72.9 10	32.77 13	27.1 2
	15	3	15	2	22	5	15	2
19.3	50.92	13.7	55.44	29.8	46.78	73.4	32.62	26.9
Mar. 1.2	50.76 16	13.5 2	55.27 17	29.5 3	46.55 23	73.4 0	32.46 16	26.7 2
11.2	50.60 16	13.2 3	55.11 16	29.2 3	46.33 22	73.0 4	32.30 16	26.4 3
21.2	50.45 15	13.0 2	54.96 15	29.0 2	46.11 22	72.2 8	32.14 16	26.1 3
31.2	50.32 13	12.8 2	54.82 14	28.8 2	45.91 20	70.9 13	32.00 14	25.8 3
	11	1	11	2	17	17	11	2
Apr. 10.1	50.21	12.7	54.71	28.6	45.74	69.2	31.89	25.6
20.1	50.14 7	12.6 1	54.64 7	28.5 1	45.61 13	67.2 20	31.81 8	25.4 2
30.1	50.12 2	12.7 1	54.61 3	28.4 1	45.52 9	64.9 23	31.78 3	25.3 1
May 10.0	50.14 2	12.9 2	54.63 2	28.5 1	45.48 4	62.3 26	31.79 1	25.3 0
20.0	50.21 7	13.3 4	54.70 7	28.7 2	45.50 2	59.5 28	31.85 6	25.4 1
	11	5	11	4	6	30	11	3
30.0	50.32	13.8	54.81	29.1	45.56	56.5	31.96	25.7
June 9.0	50.48 16	14.5 7	54.97 16	29.7 6	45.67 11	53.5 30	32.12 16	26.1 4
18.9	50.68 20	15.3 8	55.17 20	30.4 7	45.83 16	50.4 31	32.31 19	26.7 6
28.9	50.91 23	16.2 9	55.40 23	31.2 8	46.03 20	47.4 30	32.54 23	27.4 7
July 8.9	51.17 26	17.2 10	55.66 26	32.1 9	46.27 24	44.5 29	32.80 26	28.2 8
	29	11	29	10	27	26	29	9
18.9	51.46	18.3	55.95	33.1	46.54	41.9	33.09	29.1
28.8	51.77 31	19.4 11	56.26 31	34.1 10	46.84 30	39.6 23	33.40 31	30.0 9
Aug. 7.8	52.08 31	20.5 11	56.58 32	35.2 11	47.16 32	37.6 20	33.72 32	31.0 10
17.8	52.40 32	21.6 11	56.90 32	36.2 10	47.49 33	36.1 15	34.04 32	32.0 10
27.7	52.72 32	22.6 10	57.22 32	37.2 10	47.82 33	35.1 10	34.37 33	32.9 9
	31	9	32	9	33	5	32	8
Sept. 6.7	53.03	23.5	57.54	38.1	48.15	34.6	34.69	33.7
16.7	53.34 31	24.3 8	57.85 31	38.9 8	48.47 32	34.6 0	35.01 32	34.5 8
26.7	53.63 29	24.9 6	58.15 30	39.5 6	48.77 30	35.2 6	35.31 30	35.2 7
Oct. 6.6	53.91 28	25.4 5	58.43 28	40.0 5	49.06 29	36.3 11	35.60 29	35.7 5
16.6	54.17 26	25.7 3	58.69 26	40.4 4	49.32 26	37.9 16	35.87 27	36.1 4
	23	1	24	2	23	20	25	3
26.6	54.40	25.8	58.93	40.6	49.55	39.9	36.12	36.4
Nov. 5.6	54.61 21	25.8 0	59.15 22	40.7 1	49.75 20	42.2 23	36.34 22	36.6 2
15.5	54.79 18	25.8 0	59.34 19	40.8 1	49.91 16	44.8 26	36.53 19	36.7 1
25.5	54.94 15	25.7 1	59.49 15	40.7 1	50.03 12	47.6 28	36.69 16	36.7 0
Dec. 5.5	55.06 12	25.5 2	59.61 12	40.6 1	50.10 7	50.4 28	36.82 13	36.7 0
	8	3	9	1	3	27	9	0
15.4	55.14	25.2	59.70	40.5	50.13	53.1	36.91	36.7
25.4	55.18 4	25.0 2	59.74 4	40.4 1	50.11 2	55.7 26	36.96 5	36.6 1
35.4	55.18 0	24.7 3	59.74 0	40.2 2	50.05 6	58.1 24	36.97 1	36.5 1
Sec δ , Tan δ	1.037	+0.276	1.048	+0.312	1.209	-0.680	1.058	+0.344
Mean Place	50 ^s .431	5 ^{''} .94	54 ^s .928	21 ^{''} .32	46 ^s .127	66 ^{''} .36	32 ^s .083	17 ^{''} .84
D ψ α , D ω α	+0.01	-0.01	+0.01	-0.01	-0.02	+0.02	+0.01	-0.01
D ψ δ , D ω δ	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.		♄ Mensæ. Mag. 5.6		♍ Persei. Mag. 6.1		♉ Tauri. Mag. 1.1		♎ Eridani. Mag. 4.1	
		Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
		h m 4 23	° ' -80 24	h m 4 27	° ' +42 52	h m 4 30	° ' +16 20	h m 4 31	° ' - 3 31
		s	"	s	"	s	"	s	"
Jan.	0.4	57.92	70.6	18.61	58.4	56.62	16.0	59.32	40.9
	10.4	56.91 ¹⁰¹	73.0 ²⁴	18.57 ⁴	59.6 ¹²	56.60 ²	15.8 ²	59.30 ²	42.0 ¹¹
	20.4	55.73 ¹¹⁸	74.8 ¹⁸	18.48 ⁹	60.5 ⁹	56.55 ⁵	15.5 ³	59.24 ⁶	43.0 ¹⁰
Feb.	30.3	54.41 ¹³²	76.1 ¹³	18.34 ¹⁴	61.2 ⁷	56.46 ⁹	15.3 ²	59.14 ¹⁰	43.9 ⁹
	9.3	52.99 ¹⁴²	76.9 ⁸	18.17 ¹⁷	61.7 ⁵	56.34 ¹²	15.1 ²	59.01 ¹³	44.6 ⁷
Mar.	19.3	51.52 ¹⁴⁷	77.1 ²	17.97 ²⁰	61.8 ¹	56.19 ¹⁵	14.9 ²	58.86 ¹⁵	45.0 ⁴
	1.2	50.03 ¹⁴⁹	76.8 ³	17.75 ²²	61.7 ¹	56.03 ¹⁶	14.6 ³	58.70 ¹⁶	45.0 ²
	11.2	48.56 ¹⁴⁷	75.9 ⁹	17.52 ²³	61.3 ⁴	55.87 ¹⁶	14.4 ²	58.54 ¹⁶	45.2 ¹
Apr.	21.2	47.14 ¹⁴²	74.5 ¹⁴	17.31 ²¹	60.6 ⁷	55.71 ¹⁶	14.2 ²	58.38 ¹⁶	45.3 ¹
	31.2	45.81 ¹³³	72.6 ¹⁹	17.12 ¹⁹	59.7 ⁹	55.57 ¹⁴	14.0 ²	58.24 ¹⁴	45.2 ¹
May	10.1	44.61 ¹²⁰	70.3 ²³	16.97 ¹⁵	58.7 ¹⁰	55.45 ¹²	13.9 ¹	58.12 ¹²	44.8 ⁶
	20.1	43.55 ¹⁰⁶	67.7 ²⁶	16.86 ¹¹	57.5 ¹²	55.37 ⁸	13.8 ¹	58.03 ⁹	44.2 ⁸
	30.1	42.67 ⁸⁸	64.7 ³⁰	16.81 ⁵	56.2 ¹³	55.33 ⁴	13.8 ⁰	57.98 ⁵	43.4 ¹⁰
June	10.1	41.98 ⁶⁹	61.4 ³³	16.82 ¹	54.9 ¹³	55.34 ¹	13.9 ¹	57.97 ¹	42.4 ¹²
	20.0	41.50 ⁴⁸	58.0 ³⁴	16.89 ⁷	53.7 ¹²	55.39 ⁵	14.2 ³	57.97 ⁴	41.2 ¹⁴
July	30.0	41.24 ²⁶	54.5 ³⁵	17.01 ¹²	52.6 ¹¹	55.49 ¹⁰	14.6 ⁴	58.01 ⁸	39.8 ¹⁵
	9.0	41.21 ³	51.0 ³⁵	17.01 ¹⁸	52.6 ¹⁰	55.49 ¹⁴	14.6 ⁶	58.09 ¹³	38.3 ¹⁷
	18.9	41.40 ¹⁹	47.6 ³⁴	17.19 ²⁴	51.6 ⁸	55.63 ¹⁹	15.2 ⁷	58.22 ¹⁷	36.6 ¹⁸
Aug.	28.9	41.81 ⁴¹	44.3 ³³	17.43 ²⁹	50.8 ⁶	55.82 ²²	15.9 ⁸	58.39 ²⁰	34.8 ¹⁸
	8.9	42.42 ⁶¹	41.2 ³¹	17.72 ³²	50.2 ⁴	56.04 ²⁵	16.7 ⁸	58.59 ²³	33.0 ¹⁸
Sept.	18.9	42.42 ⁷⁹	38.5 ²⁷	18.04 ³⁵	49.8 ²	56.29 ²⁸	17.5 ¹⁰	58.82 ²⁵	31.2 ¹⁸
	28.8	43.21 ⁹⁶	36.2 ²³	18.39 ³⁸	49.6 ¹	56.57 ³⁰	18.5 ¹⁰	59.07 ²⁸	29.4 ¹⁷
	7.8	44.17 ¹¹⁰	34.4 ¹⁸	18.77 ⁴⁰	49.7 ³	56.87 ³¹	19.5 ¹⁰	59.35 ²⁹	27.7 ¹⁵
Oct.	17.8	45.27 ¹¹⁹	33.1 ¹³	19.17 ⁴¹	50.0 ⁵	57.18 ³²	20.5 ¹⁰	59.64 ³⁰	26.2 ¹³
	27.8	46.46 ¹²⁶	32.4 ⁷	19.58 ⁴¹	50.5 ⁶	57.50 ³²	21.5 ⁹	59.94 ³⁰	24.9 ¹⁰
Nov.	6.7	47.72 ¹²⁸	32.3 ¹	19.99 ⁴¹	51.1 ⁸	57.82 ³²	22.4 ⁸	60.24 ³⁰	23.9 ⁸
	16.7	49.00 ¹²⁶	32.3 ⁵	20.40 ⁴⁰	51.9 ⁹	58.14 ³¹	23.2 ⁷	60.54 ³⁰	23.1 ⁴
	26.7	50.26 ¹¹⁹	32.8 ¹²	20.80 ³⁸	52.8 ¹¹	58.45 ³⁰	23.9 ⁵	60.84 ²⁸	22.7 ¹
Dec.	6.6	51.45 ¹⁰⁹	34.0 ¹⁷	21.18 ³⁷	53.9 ¹²	58.75 ²⁹	24.4 ⁴	61.12 ²⁷	22.6 ²
	16.6	52.54 ⁹⁴	35.7 ²³	21.55 ³⁵	55.1 ¹³	59.04 ²⁷	24.8 ³	61.39 ²⁵	22.8 ⁵
Jan.	26.6	53.48 ⁷⁵	38.0 ²⁷	21.90 ³²	56.4 ¹⁴	59.31 ²⁵	25.1 ¹	61.64 ²³	23.3 ⁸
	5.6	54.23 ⁵⁴	40.7 ³⁰	22.22 ²⁸	57.8 ¹⁴	59.56 ²²	25.2 ⁰	61.87 ²¹	24.1 ¹⁰
	15.5	54.77 ³¹	43.7 ³³	22.50 ²⁵	59.2 ¹⁴	59.78 ²⁰	25.2 ¹	62.08 ¹⁸	25.1 ¹²
Feb.	25.5	55.08 ⁶	47.0 ³⁴	22.75 ²¹	60.6 ¹⁵	59.98 ¹⁷	25.1 ²	62.26 ¹⁵	26.3 ¹⁴
	5.5	55.14 ²⁰	50.4 ³³	22.96 ¹⁶	62.1 ¹⁵	60.15 ¹³	24.9 ²	62.41 ¹¹	27.7 ¹⁴
Mar.	15.5	54.94 ⁴⁴	53.7 ³²	23.12 ¹¹	63.6 ¹⁴	60.28 ¹⁰	24.7 ²	62.52 ⁸	29.1 ¹⁴
	25.4	54.50 ⁶⁸	56.9 ³⁰	23.23 ⁶	65.0 ¹³	60.38 ⁶	24.5 ²	62.60 ⁴	30.5 ¹³
	35.4	53.82 ⁹⁰	59.9 ²⁶	23.29 ⁰	66.3 ¹²	60.44 ¹	24.3 ³	62.64 ¹	31.8 ¹³
Sec δ, Tan δ		6.006	-5.922	1.364	+0.929	1.042	+0.293	1.002	-0.062
Mean Place		49°.572	66''.81	17°.396	44''.47	55°.598	6''.72	58°.248	46''.43
D'ψ α, Dω α		-0.14	+0.15	+0.02	-0.02	+0.01	-0.01	0.00	0.00
Dψ δ, Dω δ		+0.2	+0.9	+0.2	+0.9	+0.2	+0.9	+0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Doradus. Mag. 3.5		δ Eridani. Mag. 4.0		τ Tauri. Mag. 4.3		Groombridge 848. Mag. 6.0	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 4 32	° ' -55 12	h m 4 34	° ' -14 27	h m 4 37	° ' +22 47	h m 4 37	° ' +75 47
	s	"	s	"	s	"	s	"
Jan. 0.4	9.23	90.7	12.83	80.4	2.36	37.4	10.01	21.7
10.4	9.04 ¹⁹	93.3 ²⁶	12.79 ⁴	82.0 ¹⁶	2.35 ¹	37.5 ¹	9.76 ²⁵	24.3 ²⁶
20.4	8.79 ²⁵	95.4 ²¹	12.72 ⁷	83.4 ¹⁴	2.30 ⁵	37.6 ¹	9.35 ⁴¹	26.6 ²³
30.3	8.50 ²⁹	97.1 ¹⁷	12.61 ¹¹	84.6 ¹²	2.21 ⁹	37.7 ¹	8.81 ⁵⁴	28.5 ¹⁹
Feb. 9.3	8.17 ³³	98.2 ¹¹	12.47 ¹⁴	85.4 ⁸	2.08 ¹³	37.6 ¹	8.16 ⁶⁵	29.9 ¹⁴
	36	6	16	6	15	1	73	8
19.3	7.81	98.8	12.31	86.0	1.93	37.5	7.43	30.7
Mar. 1.2	7.43 ³⁸	98.8 ⁰	12.14 ¹⁷	86.3 ³	1.76 ¹⁷	37.3 ²	6.66 ⁷⁷	31.0 ³
11.2	7.05 ³⁸	98.3 ⁵	11.96 ¹⁸	86.3 ⁰	1.59 ¹⁷	37.1 ²	5.88 ⁷⁸	30.7 ³
21.2	6.69 ³⁶	97.2 ¹¹	11.79 ¹⁷	85.9 ⁴	1.43 ¹⁶	36.8 ³	5.13 ⁷⁵	29.9 ⁸
31.2	6.35 ³⁴	95.7 ¹⁵	11.63 ¹⁶	85.2 ⁷	1.28 ¹⁵	36.4 ⁴	4.45 ⁶⁸	28.5 ¹⁴
	30	20	13	9	12	3	58	18
Apr. 10.1	6.05	93.7	11.50	84.3	1.16	36.1	3.87	26.7
20.1	5.80 ²⁵	91.3 ²⁴	11.40 ¹⁰	83.1 ¹²	1.07 ⁹	35.8 ³	3.41 ⁴⁶	24.6 ²¹
30.1	5.60 ²⁰	88.6 ²⁷	11.34 ⁶	81.6 ¹⁵	1.02 ⁵	35.5 ³	3.10 ³¹	22.2 ²⁴
May 10.1	5.46 ¹⁴	85.5 ³¹	11.32 ²	79.9 ¹⁷	1.02 ⁰	35.3 ²	2.95 ¹⁵	19.6 ²⁶
20.0	5.39 ⁷	82.2 ³³	11.34 ²	77.9 ²⁰	1.07 ⁵	35.2 ¹	2.96 ¹	16.9 ²⁷
	0	34	7	21	10	0	18	26
30.0	5.39	78.8	11.41	75.8	1.17	35.2	3.14	14.3
June 9.0	5.46 ⁷	75.3 ³⁵	11.52 ¹¹	73.6 ²²	1.31 ¹⁴	35.3 ¹	3.49 ³⁵	11.7 ²⁶
18.9	5.60 ¹⁴	71.8 ³⁵	11.68 ¹⁶	71.3 ²³	1.50 ¹⁹	35.6 ³	3.99 ⁵⁰	9.3 ²⁴
28.9	5.80 ²⁰	68.4 ³⁴	11.87 ¹⁹	69.0 ²³	1.73 ²³	36.0 ⁴	4.63 ⁶⁴	7.2 ²¹
July 8.9	6.06 ²⁶	65.2 ³²	12.10 ²³	66.8 ²²	1.99 ²⁶	36.5 ⁵	5.40 ⁷⁷	5.3 ¹⁹
	31	29	25	22	28	7	87	15
18.9	6.37	62.3	12.35	64.6	2.27	37.2	6.27	3.8
28.8	6.73 ³⁶	59.7 ²⁶	12.62 ²⁷	62.6 ²⁰	2.58 ³¹	37.9 ⁷	7.23 ⁹⁶	2.6 ¹²
Aug. 7.8	7.12 ³⁹	57.6 ²¹	12.91 ²⁹	60.9 ¹⁷	2.90 ³²	38.7 ⁸	8.26 ¹⁰³	1.8 ⁸
17.8	7.54 ⁴²	56.0 ¹⁶	13.21 ³⁰	59.5 ¹⁴	3.23 ³³	39.5 ⁸	9.33 ¹⁰⁷	1.5 ³
27.8	7.97 ⁴³	55.0 ¹⁰	13.52 ³¹	58.4 ¹¹	3.57 ³⁴	40.3 ⁸	10.43 ¹¹⁰	1.6 ¹
	43	4	30	7	33	8	110	5
Sept. 6.7	8.40	54.6	13.82	57.7	3.90	41.1	11.53	2.1
16.7	8.82 ⁴²	54.8 ²	14.11 ²⁹	57.4 ³	4.22 ³²	41.8 ⁷	12.62 ¹⁰⁹	3.0 ⁹
26.7	9.23 ⁴¹	55.6 ⁸	14.39 ²⁸	57.5 ¹	4.54 ³²	42.4 ⁶	13.69 ¹⁰⁷	4.3 ¹³
Oct. 6.6	9.61 ³⁸	57.0 ¹⁴	14.66 ²⁷	58.0 ⁵	4.84 ³⁰	42.9 ⁵	14.71 ¹⁰²	5.9 ¹⁶
16.6	9.96 ³⁵	59.0 ²⁰	14.91 ²⁵	58.9 ⁹	5.13 ²⁹	43.4 ⁵	15.66 ⁹⁵	7.9 ²⁰
	30	25	23	13	27	4	87	23
26.6	10.26	61.5	15.14	60.2	5.40	43.8	16.53	10.2
Nov. 5.6	10.50 ²⁴	64.4 ²⁹	15.35 ²¹	61.8 ¹⁶	5.64 ²⁴	44.1 ³	17.29 ⁷⁶	12.8 ²⁶
15.5	10.68 ¹⁸	67.6 ³²	15.53 ¹⁸	63.6 ¹⁸	5.85 ²¹	44.4 ³	17.93 ⁶⁴	15.6 ²⁸
25.5	10.80 ¹²	70.9 ³³	15.67 ¹⁴	65.5 ¹⁹	6.03 ¹⁸	44.6 ²	18.43 ⁵⁰	18.6 ³⁰
Dec. 5.5	10.86 ⁶	74.3 ³⁴	15.78 ¹¹	67.5 ²⁰	6.18 ¹⁵	44.8 ²	18.79 ³⁶	21.6 ³⁰
	2	33	7	20	11	2	20	31
15.5	10.84	77.6	15.85	69.5	6.29	45.0	18.99	24.7
25.4	10.75 ⁹	80.7 ³¹	15.88 ³	71.4 ¹⁹	6.35 ⁶	45.1 ¹	19.01 ²	27.6 ²⁹
35.4	10.60 ¹⁵	83.5 ²⁸	15.87 ¹	73.1 ¹⁷	6.37 ²	45.2 ¹	18.86 ¹⁵	30.4 ²⁸
Sec δ , Tan δ	1.753	-1.440	1.033	-0.258	1.085	+0.420	4.073	+3.948
Mean Place	6 ^s .930	88 ^{''} .81	11 ^s .664	84 ^{''} .09	1 ^s .298	27 ^{''} .06	6 ^s .285	4 ^{''} .45
D ψ α , D ω α	-0.03	+0.03	-0.01	+0.01	+0.01	-0.01	+0.10	-0.09
D ψ δ , D ω δ	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Coeli. Mag. 4.5		ϵ Camelop. Mag. 5.4		μ Eridani. Mag. 4.2		π^3 Orionis. Mag. 3.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 4 37 s	° ' " -42 1 "	h m 4 40 s	° ' " +56 36 "	h m 4 41 s	° ' " - 3 24 "	h m 4 45 s	° ' " + 6 48 "
Jan. 0.4	47.10	47.1	46.76	29.1	10.20	42.3	8.04	44.5
10.4	47.00 10	49.6 25	46.70 6	30.9 18	10.18 2	43.5 12	8.03 1	43.8 7
20.4	46.85 15	51.7 21	46.58 12	32.5 16	10.12 6	44.5 10	7.98 5	43.2 6
30.3	46.66 19	53.3 16	46.39 19	33.8 13	10.03 9	45.4 9	7.90 8	42.7 5
Feb. 9.3	46.43 23	54.5 12	46.15 24	34.8 10	9.91 12	46.1 7	7.79 11	42.2 5
	25	7	28	5	15	5	14	4
19.3	46.18	55.2	45.87	35.3	9.76	46.6	7.65	41.8
Mar. 1.3	45.91 27	55.4 2	45.56 31	35.4 1	9.60 16	46.9 3	7.49 16	41.6 2
11.2	45.64 27	55.1 3	45.24 32	35.1 3	9.43 17	46.9 0	7.33 16	41.5 1
21.2	45.38 26	54.3 8	44.93 31	34.4 7	9.27 16	46.8 1	7.17 16	41.4 1
31.2	45.14 24	53.1 12	44.66 27	33.4 10	9.12 15	46.5 3	7.03 14	41.5 1
	21	17	23	14	12	5	12	2
Apr. 10.1	44.93 18	51.4 21	44.43 18	32.0 16	9.00 9	46.0 8	6.91 9	41.7 3
20.1	44.75 13	49.3 24	44.25 11	30.4 18	8.91 6	45.2 10	6.82 6	42.0 5
30.1	44.62 8	46.9 27	44.14 3	28.6 19	8.85 1	44.2 12	6.76 1	42.5 6
May 10.1	44.54 3	44.2 30	44.11 5	26.7 19	8.84 3	43.0 13	6.75 4	43.1 8
20.0	44.51 3	41.2 31	44.16 12	24.8 18	8.87 7	41.7 15	6.79 8	43.9 9
30.0	44.54 8	38.1 32	44.28 20	23.0 18	8.94 12	40.2 17	6.87 12	44.8 11
June 9.0	44.62 13	34.9 33	44.48 27	21.2 16	9.06 16	38.5 17	6.99 16	45.9 12
19.0	44.75 18	31.6 32	44.75 34	19.6 14	9.22 19	36.8 18	7.15 20	47.1 13
28.9	44.93 23	28.4 31	45.09 39	18.2 11	9.41 23	35.0 18	7.35 23	48.4 13
July 8.9	45.16 27	25.3 28	45.48 44	17.1 9	9.64 25	33.2 17	7.58 26	49.7 13
18.9	45.43 30	22.5 25	45.92 47	16.2 6	9.89 27	31.5 17	7.84 28	51.0 13
28.8	45.73 33	20.0 21	46.39 50	15.6 3	10.16 29	29.8 15	8.12 29	52.3 12
Aug. 7.8	46.06 34	17.9 17	46.89 52	15.3 0	10.45 29	28.3 13	8.41 30	53.5 11
17.8	46.40 35	16.2 11	47.41 52	15.3 3	10.74 30	27.0 10	8.71 31	54.6 9
27.8	46.75 36	15.1 5	47.93 53	15.6 6	11.04 30	26.0 7	9.02 31	55.5 7
Sept. 6.7	47.11 35	14.6 0	48.46 52	16.2 8	11.34 29	25.3 5	9.33 30	56.2 5
16.7	47.46 33	14.6 6	48.98 51	17.0 11	11.63 29	24.8 1	9.63 29	56.7 3
26.7	47.79 32	15.2 12	49.49 49	18.1 13	11.92 27	24.7 2	9.92 29	57.0 1
Oct. 6.7	48.11 29	16.4 17	49.98 46	19.4 16	12.19 26	24.9 5	10.21 27	57.1 2
16.6	48.40 26	18.1 21	50.44 43	21.0 17	12.45 24	25.4 8	10.48 25	56.9 4
26.6	48.66 22	20.2 26	50.87 38	22.7 19	12.69 22	26.2 11	10.73 23	56.5 5
Nov. 5.6	48.88 18	22.8 29	51.25 33	24.6 20	12.91 19	27.3 12	10.96 20	56.0 6
15.5	49.06 14	25.7 30	51.58 28	26.6 21	13.10 16	28.5 14	11.16 17	55.4 8
25.5	49.20 8	28.7 31	51.86 22	28.7 22	13.26 12	29.9 14	11.33 14	54.6 9
Dec. 5.5	49.28 3	31.8 31	52.08 15	30.9 22	13.38 9	31.3 14	11.47 10	53.7 8
15.5	49.31 2	34.9 29	52.23 7	33.1 20	13.47 5	32.7 14	11.57 6	52.9 8
25.4	49.29 7	37.8 27	52.30 1	35.1 20	13.52 1	34.1 13	11.63 3	52.1 8
35.4	49.22	40.5	52.29	37.1	13.53	35.4	11.66	51.3
Sec δ , Tan δ	1.346	-0.901	1.817	+1.517	1.002	-0.060	1.007	+0.119
Mean Place	45°.405	47''.00	45°.063	13''.81	9°.096	48''.08	6°.961	36''.96
$D_p \alpha$, $D_w \alpha$	-0.02	+0.02	+0.04	-0.03	0.00	0.00	0.00	0.00
$D_p \delta$, $D_w \delta$	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9	+0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 Camelop. Mag. 4.4		ι Tauri. Mag. 5.1		π ⁵ Orionis. Mag. 3.9		ι Aurigæ. Mag. 2.9	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 4 45 s	° ' +66 11 "	h m 4 46 s	° ' +18 41 "	h m 4 49 s	° ' + 2 17 "	h m 4 51 s	° ' +33 1 "
Jan. 0.4	26.00	62.7	18.07	43.0	44.23	63.5	20.75	57.0
10.4	25.91 9	65.0 23	18.06 1	42.9 1	44.22 1	62.5 10	20.75 0	57.7 7
20.4	25.71 20	67.0 20	18.02 4	42.8 1	44.18 4	61.7 8	20.70 5	58.3 6
30.3	25.43 28	68.7 17	17.94 8	42.7 1	44.10 8	61.0 7	20.61 9	58.8 5
Feb. 9.3	25.08 35 41	69.9 12 7	17.82 12 15	42.6 1 2	43.98 12 14	60.4 6 4	20.47 14 17	59.1 3 2
19.3	24.67	70.6	17.67	42.4	43.84	60.0	20.30	59.3
Mar. 1.3	24.23 44	70.9 3	17.51 16	42.2 2	43.68 16	59.7 3	20.12 18	59.3 0
11.2	23.78 45	70.7 2	17.34 17	42.0 2	43.52 16	59.6 1	19.93 19	59.1 2
21.2	23.34 44	70.0 7	17.18 16	41.8 2	43.36 16	59.6 0	19.74 19	58.7 4
31.2	22.94 40 34	68.9 11 15	17.03 15 12	41.6 2 2	43.21 15 13	59.8 2 4	19.57 17 15	58.2 5 7
Apr. 10.1	22.60	67.4	16.91	41.4	43.08	60.2	19.42	57.5
20.1	22.34 26	65.5 19	16.82 9	41.3 1	42.99 9	60.7 5	19.31 11	56.8 7
30.1	22.16 18	63.4 21	16.76 6	41.2 1	42.93 6	61.4 7	19.25 6	56.1 7
May 10.1	22.08 8	61.2 22	16.75 1	41.2 0	42.91 2	62.2 8	19.24 1	55.4 7
20.0	22.10 2 13	58.9 23 23	16.79 4 9	41.3 1 2	42.94 3 7	63.2 10 12	19.28 4 9	54.7 7 7
30.0	22.23	56.6	16.88	41.5	43.01	64.4	19.37	54.0
June 9.0	22.46 23	54.4 22	17.01 13	41.9 4	43.12 11	65.7 13	19.51 14	53.5 5
19.0	22.79 33	52.3 21	17.19 18	42.4 5	43.28 16	67.1 14	19.70 19	53.2 3
28.9	23.20 41	50.5 18	17.40 21	43.0 6	43.47 19	68.6 15	19.93 23	53.0 2
July 8.9	23.69 49 55	48.9 16 13	17.64 24 27	43.7 7 8	43.69 22 25	70.1 15 15	20.20 27 30	52.9 1 0
18.9	24.24	47.6	17.91	44.5	43.94	71.6	20.50	52.9
28.8	24.85 61	46.6 10	18.21 30	45.3 8	44.21 27	73.0 14	20.82 32	53.1 2
Aug. 7.8	25.50 65	46.0 6	18.52 31	46.1 8	44.50 29	74.3 13	21.17 35	53.4 3
17.8	26.18 68	45.7 3	18.84 32	46.9 8	44.80 30	75.5 12	21.53 36	53.9 5
27.8	26.88 70 70	45.8 1 4	19.16 32 32	47.7 8 7	45.10 30 30	76.5 10 7	21.89 36 36	54.4 5 6
Sept. 6.7	27.58	46.2	19.48	48.4	45.40	77.2	22.25	55.0
16.7	28.27 69	47.0 8	19.80 32	49.0 6	45.70 30	77.7 5	22.61 36	55.6 6
26.7	28.95 68	48.1 11	20.11 31	49.5 5	45.99 29	77.9 2	22.96 35	56.3 7
Oct. 6.7	29.60 65	49.5 14	20.41 30	49.9 4	46.27 28	77.8 1	23.30 34	57.0 7
16.6	30.21 61 57	51.2 17 20	20.70 29 26	50.2 3 1	46.53 26 25	77.5 3 6	23.62 32 31	57.7 7 8
26.6	30.78	53.2	20.96	50.3	46.78	76.9	23.93	58.5
Nov. 5.6	31.29 51	55.5 23	21.20 24	50.4 1	47.01 23	76.1 8	24.21 28	59.2 7
15.5	31.73 44	57.9 24	21.42 22	50.4 0	47.21 20	75.1 10	24.46 25	60.0 8
25.5	32.09 36	60.4 25	21.61 19	50.3 1	47.38 17	74.1 10	24.67 21	60.7 7
Dec. 5.5	32.37 28 18	63.0 26 27	21.76 15 11	50.2 1 1	47.52 14 10	73.0 11 12	24.85 18 13	61.5 8 8
15.5	32.55	65.7	21.87	50.1	47.62	71.8	24.98	62.3
25.4	32.62 7	68.2 25	21.94 7	50.0 1	47.68 6	70.7 11	25.06 8	63.1 8
35.4	32.59 3	70.6 24	21.97 3	49.9 1	47.71 3	69.7 10	25.09 3	63.8 7
Sec δ, Tan δ	2.478	+2.267	1.056	+0.338	1.001	+0.040	1.193	+0.650
Mean Place	23 ^h .645	46 ^m '' .67	16 ^h .980	33 ^m '' .44	43 ^h .132	56 ^m '' .62	19 ^h .540	45 ^m '' .36
D'ψ a, Dω a	+0.06	-0.05	+0.01	-0.01	0.00	0.00	+0.02	-0.01
Dψ δ, Dω δ	+0.1	+0.9	+0.1	+0.9	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Camelop. Mag. 4.2		ϵ Aurigæ. Var. 3.0-4.5		ζ Aurigæ. Mag. 3.9		ι Tauri. Mag. 4.7	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 4 55 s	° ' " +60 18 "	h m 4 55 s	° ' " +43 41 "	h m 4 56 s	° ' " +40 56 "	h m 4 57 s	° ' " +21 27 "
Jan. 0.4	42.39	73.9	44.81	57.0	24.99	72.2	54.81	69.0
10.4	42.35 4	76.0 21	44.81 0	58.3 13	24.99 0	73.3 11	54.82 1	69.1 1
20.4	42.23 12	77.8 18	44.75 6	59.4 11	24.94 5	74.3 10	54.78 4	69.1 0
30.3	42.03 20	79.3 15	44.64 11	60.3 9	24.83 11	75.1 8	54.70 8	69.2 1
Feb. 9.3	41.76 27 31	80.5 12 8	44.48 16 20	61.0 7 4	24.68 15 18	75.7 6 4	54.59 11 14	69.2 0 1
19.3	41.45	81.3	44.28	61.4	24.50	76.1	54.45	69.1
Mar. 1.3	41.11 34	81.6 3	44.06 22	61.5 1	24.29 21	76.2 1	54.29 16	69.0 1
11.2	40.75 36	81.5 1	43.83 23	61.4 1	24.07 22	76.0 2	54.11 18	68.8 2
21.2	40.40 35	80.9 6	43.61 22	60.9 5	23.86 21	75.6 4	53.94 17	68.6 2
31.2	40.07 33 28	80.0 9 13	43.40 21 18	60.2 7 9	23.66 20 17	75.0 6 8	53.78 16 13	68.4 2 3
Apr. 10.2	39.79	78.7	43.22	59.3	23.49	74.2	53.65	68.1
20.1	39.57 22	77.1 16	43.09 13	58.3 10	23.36 13	73.2 10	53.55 10	67.9 2
30.1	39.42 15	75.3 18	43.01 8	57.1 12	23.28 8	72.1 11	53.49 6	67.7 2
May 10.1	39.35 7	73.3 20	42.98 3	55.8 13	23.26 2	71.0 11	53.47 2	67.5 2
20.0	39.37 2 10	71.2 21 20	43.01 3 9	54.5 13 12	23.29 3 9	69.9 11 11	53.50 3 8	67.4 1 1
30.0	39.47	69.2	43.10	53.3	23.38	68.8	53.58	67.5
June 9.0	39.66 19	67.2 20	43.25 15	52.2 11	23.52 14	67.8 10	53.70 12	67.7 2
19.0	39.93 27	65.4 18	43.46 21	51.2 10	23.72 20	67.0 8	53.87 17	67.9 2
28.9	40.27 34	63.7 17	43.71 25	50.4 8	23.97 25	66.3 7	54.08 21	68.3 4
July 8.9	40.67 40 45	62.3 14 12	44.01 30 34	49.7 7 5	24.26 29 32	65.8 5 3	54.32 24 27	68.8 5 6
18.9	41.12	61.1	44.35	49.2	24.58	65.5	54.59	69.4
28.9	41.62 50	60.2 9	44.72 37	49.0 2	24.93 35	65.3 2	54.88 29	70.0 6
Aug. 7.8	42.16 54	59.6 6	45.11 39	48.9 1	25.31 38	65.3 0	55.19 31	70.7 7
17.8	42.72 56	59.3 3	45.51 40	49.0 1	25.70 39	65.5 2	55.51 32	71.4 7
27.8	43.30 58 58	59.3 0 3	45.92 41 42	49.3 3 5	26.09 39 40	65.8 3 5	55.83 32 33	72.1 7 6
Sept. 6.7	43.88	59.6	46.34	49.8	26.49	66.3	56.16	72.7
16.7	44.46 58	60.3 7	46.75 41	50.4 6	26.89 40	66.9 6	56.49 33	73.2 5
26.7	45.03 57	61.2 9	47.15 40	51.2 8	27.28 39	67.6 7	56.81 32	73.6 4
Oct. 6.7	45.58 55	62.4 12	47.54 39	52.1 9	27.65 37	68.5 9	57.12 31	74.0 4
16.6	46.10 52 49	63.8 14 17	47.92 38 35	53.1 10 11	28.01 36 34	69.4 9 10	57.41 29 28	74.3 3 2
26.6	46.59	65.5	48.27	54.2	28.35	70.4	57.69	74.5
Nov. 5.6	47.04 45	67.4 19	48.59 32	55.4 12	28.66 31	71.5 11	57.95 26	74.6 1
15.6	47.43 39	69.5 21	48.88 29	56.7 13	28.94 28	72.6 11	58.18 23	74.7 1
25.5	47.76 33	71.7 22	49.13 25	58.1 14	29.18 24	73.8 12	58.38 20	74.7 0
Dec. 5.5	48.02 26 18	74.0 23 23	49.33 20 15	59.5 14 14	29.38 20 15	75.1 13 12	58.55 17 13	74.8 1 0
15.5	48.20	76.3	49.48	60.9	29.53	76.3	58.68	74.8
25.4	48.30 10	78.6 23	49.57 9	62.2 13	29.62 9	77.5 12	58.76 8	74.9 1
35.4	48.31 1	80.7 21	49.61 4	63.5 13	29.66 4	78.6 11	58.80 4	74.9 0
Sec δ , Tan δ	2.019	+1.755	1.383	+0.956	1.324	+0.868	1.075	+0.393
Mean Place	40°.373	58''.98	43°.415	44''.02	23°.644	59''.60	53°.668	59''.21
$D\delta a$, $D\omega a$	+0.05	-0.03	+0.02	-0.02	+0.02	-0.02	+0.01	-0.01
$D\delta \delta$, $D\omega \delta$	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	11 Orionis. Mag. 4.6		η Aurigæ. Mag. 3.3		ε Leporis. Mag. 3.3		β Eridani. Mag. 2.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 4 59 s	° ' +15 17 "	h m 5 0 s	° ' +41 7 "	h m 5 1 s	° ' -22 28 "	h m 5 3 s	° ' - 5 11 "
Jan. 0.4	36.92	10.5	26.08	16.5	47.97	70.5	35.51	47.3
10.4	36.93 ¹	10.2 ³	26.09 ¹	17.7 ¹²	47.95 ²	72.6 ²¹	35.51 ⁰	48.7 ¹⁴
20.4	36.90 ³	9.9 ³	26.04 ⁵	18.7 ¹⁰	47.88 ⁷	74.4 ¹⁸	35.47 ⁴	49.9 ¹²
30.3	36.82 ⁸	9.7 ²	25.94 ¹⁰	19.5 ⁸	47.77 ¹¹	75.9 ¹⁵	35.39 ⁸	50.9 ¹⁰
Feb. 9.3	36.71 ¹¹	9.5 ²	25.79 ¹⁵	20.1 ⁶	47.63 ¹⁴	77.1 ¹²	35.28 ¹¹	51.7 ⁸
	14	2	19	4	17	8	14	6
19.3	36.57	9.3	25.60	20.5	47.46	77.9	35.14	52.3
Mar. 1.3	36.42 ¹⁵	9.1 ²	25.39 ²¹	20.6 ¹	47.27 ¹⁹	78.4 ⁵	34.98 ¹⁶	52.6 ³
11.2	36.25 ¹⁷	9.0 ¹	25.18 ²¹	20.5 ¹	47.07 ²⁰	78.5 ¹	34.81 ¹⁷	52.8 ²
21.2	36.08 ¹⁷	8.9 ¹	24.96 ²²	20.1 ⁴	46.87 ²⁰	78.2 ³	34.64 ¹⁷	52.7 ¹
31.2	35.93 ¹⁵	8.8 ¹	24.76 ²⁰	19.5 ⁶	46.69 ¹⁸	77.5 ⁷	34.48 ¹⁶	52.4 ³
	13	1	17	8	16	10	14	6
Apr. 10.2	35.80	8.7	24.59	18.7	46.53	76.5	34.34	51.8
20.1	35.70 ¹⁰	8.7 ⁰	24.46 ¹³	17.7 ¹⁰	46.40 ¹³	75.2 ¹³	34.23 ¹¹	51.0 ⁸
30.1	35.64 ⁶	8.8 ¹	24.37 ⁹	16.7 ¹⁰	46.30 ¹⁰	73.6 ¹⁶	34.16 ⁷	50.0 ¹⁰
May 10.1	35.62 ²	9.0 ²	24.34 ³	15.6 ¹¹	46.24 ⁶	71.7 ¹⁹	34.12 ⁴	48.9 ¹¹
20.0	35.65 ³	9.3 ³	24.37 ³	14.5 ¹¹	46.23 ¹	69.5 ²²	34.13 ¹	47.5 ¹⁴
	7	4	9	11	4	24	5	15
30.0	35.72	9.7	24.46	13.4	46.27	67.1	34.18	46.0
June 9.0	35.83 ¹¹	10.2 ⁵	24.60 ¹⁴	12.4 ¹⁰	46.35 ⁸	64.6 ²⁵	34.28 ¹⁰	44.3 ¹⁷
19.0	35.99 ¹⁶	10.8 ⁶	24.80 ²⁰	11.5 ⁹	46.47 ¹²	62.1 ²⁵	34.41 ¹³	42.6 ¹⁷
28.9	36.19 ²⁰	11.5 ⁷	25.04 ²⁴	10.8 ⁷	46.64 ¹⁷	59.5 ²⁶	34.58 ¹⁷	40.8 ¹⁸
July 8.9	36.42 ²³	12.3 ⁸	25.32 ²⁸	10.2 ⁶	46.84 ²⁰	56.9 ²⁶	34.79 ²¹	39.0 ¹⁸
	25	9	32	4	23	24	23	18
18.9	36.67	13.2	25.64	9.8	47.07	54.5	35.02	37.2
28.9	36.95 ²⁸	14.1 ⁹	25.99 ³⁵	9.6 ²	47.32 ²⁵	52.3 ²²	35.28 ²⁶	35.5 ¹⁷
Aug. 7.8	37.25 ³⁰	14.9 ⁸	26.37 ³⁸	9.6 ⁰	47.60 ²⁸	50.4 ¹⁹	35.56 ²⁸	34.0 ¹⁵
17.8	37.56 ³¹	15.7 ⁸	26.76 ³⁹	9.7 ¹	47.90 ³⁰	48.8 ¹⁶	35.85 ²⁹	32.7 ¹³
27.8	37.87 ³¹	16.5 ⁸	27.15 ³⁹	10.0 ³	48.20 ³⁰	47.6 ¹²	36.14 ²⁹	31.7 ¹⁰
	32	6	40	4	31	8	30	7
Sept. 6.7	38.19	17.1	27.55	10.4	48.51	46.8	36.44	31.0
16.7	38.50 ³¹	17.6 ⁵	27.95 ⁴⁰	11.0 ⁶	48.81 ³⁰	46.5 ³	36.74 ³⁰	30.6 ⁴
26.7	38.81 ³¹	18.0 ⁴	28.34 ³⁹	11.7 ⁷	49.11 ³⁰	46.7 ²	37.03 ²⁹	30.5 ¹
Oct. 6.7	39.11 ³⁰	18.2 ²	28.72 ³⁸	12.5 ⁸	49.40 ²⁹	47.3 ⁶	37.31 ²⁸	30.8 ³
16.6	39.40 ²⁹	18.3 ¹	29.08 ³⁶	13.3 ⁸	49.67 ²⁷	48.4 ¹¹	37.58 ²⁷	31.4 ⁶
	27	1	34	10	26	15	25	9
26.6	39.67	18.2	29.42	14.3	49.93	49.9	37.83	32.3
Nov. 5.6	39.92 ²⁵	18.0 ²	29.74 ³²	15.4 ¹¹	50.16 ²³	51.8 ¹⁹	38.06 ²³	33.5 ¹²
15.6	40.14 ²²	17.8 ²	30.03 ²⁹	16.5 ¹¹	50.36 ²⁰	54.0 ²²	38.27 ²¹	34.9 ¹⁴
25.5	40.34 ²⁰	17.5 ³	30.27 ²⁴	17.7 ¹²	50.52 ¹⁶	56.4 ²⁴	38.45 ¹⁸	36.4 ¹⁵
Dec. 5.5	40.50 ¹⁶	17.1 ⁴	30.47 ²⁰	18.9 ¹²	50.65 ¹³	58.8 ²⁴	38.59 ¹⁴	38.0 ¹⁶
	12	4	15	12	9	25	11	16
15.5	40.62	16.7	30.62	20.1	50.74	61.3	38.70	39.6
25.4	40.70 ⁸	16.4 ³	30.72 ¹⁰	21.3 ¹²	50.79 ⁵	63.7 ²⁴	38.77 ⁷	41.1 ¹⁵
35.4	40.74 ⁴	16.0 ⁴	30.77 ⁵	22.5 ¹²	50.79 ⁰	65.9 ²²	38.80 ³	42.6 ¹⁵
Sec δ, Tan δ	1.037	+0.273	1.327	+0.873	1.082	-0.414	1.004	-0.091
Mean Place	35 ^s .797	1 ^{''} .59	24 ^s .709	4 ^{''} .04	46 ^s .658	74 ^{''} .10	34 ^s .351	53 ^{''} .24
D'ψ a, Dω a	+0.01	0.00	+0.02	-0.02	-0.01	+0.01	0.00	0.00
Dψ δ, Dω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Aurigæ. Mag. 4.8		19 H. Camelop. Mag. 5.2		μ Leporis. Mag. 3.3		α Aurigæ. Mag. 0.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 5 7	° ' +38 22	h m 5 8	° ' +79 7	h m 5 9	° ' -16 18	h m 5 10	° ' +45 54
	s	"	s	"	s	"	s	"
Jan. 0.4	29.69	68.5	17.52	76.2	2.64	23.4	17.12	50.8
10.4	29.71 2	69.5 10	17.31 21	79.1 29	2.63 1	25.3 19	17.14 2	52.2 14
20.4	29.67 4	70.4 9	16.88 43	81.7 26	2.58 5	26.9 16	17.09 5	53.4 12
30.4	29.58 9	71.1 7	16.26 62	83.9 22	2.49 9	28.3 14	16.98 11	54.5 11
Feb. 9.3	29.44 14	71.7 6	15.47 79	85.7 18	2.36 13	29.4 11	16.82 16	55.3 8
	17	4	91	13	16	8	19	6
19.3	29.27	72.1	14.56	87.0	2.20	30.2	16.63	55.9
Mar. 1.3	29.07 20	72.3 2	13.56 100	87.7 7	2.03 17	30.7 5	16.41 22	56.2 3
11.2	28.86 21	72.2 1	12.52 104	87.9 2	1.85 18	30.9 2	16.17 24	56.1 1
21.2	28.66 20	71.9 3	11.49 103	87.5 4	1.66 19	30.7 2	15.93 24	55.8 3
31.2	28.47 19	71.4 5	10.53 96	86.5 10	1.48 18	30.2 5	15.71 22	55.2 6
	17	7	86	15	15	8	20	9
Apr. 10.2	28.30	70.7	9.67	85.0	1.33	29.4	15.51	54.3
20.1	28.17 13	69.9 8	8.95 72	83.1 19	1.21 12	28.3 11	15.35 16	53.3 10
30.1	28.08 9	69.0 9	8.40 55	80.9 22	1.12 9	26.9 14	15.25 10	52.1 12
May 10.1	28.04 4	68.0 10	8.04 36	78.4 25	1.07 5	25.2 17	15.20 5	50.8 13
20.1	28.06 2	67.0 10	7.89 15	75.7 27	1.06 1	23.3 19	15.21 1	49.4 14
	8	9	6	28	3	20	8	14
30.0	28.14	66.1	7.95	72.9	1.09	21.3	15.29	48.0
June 9.0	28.27 13	65.2 9	8.22 27	70.1 28	1.17 8	19.1 22	15.43 14	46.7 13
19.0	28.45 18	64.4 8	8.70 48	67.5 26	1.29 12	16.8 23	15.62 19	45.5 12
28.9	28.68 23	63.8 6	9.37 67	65.0 25	1.45 16	14.5 23	15.87 25	44.5 10
July 8.9	28.95 27	63.3 5	10.22 85	62.7 23	1.65 20	12.2 23	16.16 29	43.6 9
	31	3	100	20	23	22	33	7
18.9	29.26	63.0	11.22	60.7	1.88	10.0	16.49	42.9
28.9	29.59 33	62.9 1	12.36 114	59.1 16	2.13 25	8.0 20	16.86 37	42.4 5
Aug. 7.8	29.95 36	62.9 0	13.61 125	57.8 13	2.40 27	6.2 18	17.25 39	42.0 4
17.8	30.32 37	63.0 1	14.94 133	56.9 9	2.69 29	4.7 15	17.66 41	41.9 1
27.8	30.70 38	63.2 2	16.33 139	56.4 5	2.98 29	3.5 12	18.08 42	42.0 1
	38	4	142	0	30	8	43	3
Sept. 6.8	31.08	63.6	17.75	56.4	3.28	2.7	18.51	42.3
16.7	31.47 39	64.1 5	19.18 143	56.8 4	3.58 30	2.3 4	18.94 43	42.7 4
26.7	31.85 38	64.7 6	20.60 142	57.6 8	3.87 29	2.4 1	19.37 43	43.3 6
Oct. 6.7	32.22 37	65.3 6	21.98 138	58.8 12	4.16 29	2.9 5	19.78 41	44.0 7
16.6	32.57 35	66.0 7	23.29 131	60.4 16	4.43 27	3.9 10	20.18 40	44.9 9
	34	8	122	20	26	13	38	10
26.6	32.91	66.8	24.51	62.4	4.69	5.2	20.56	45.9
Nov. 5.6	33.22 31	67.7 9	25.61 110	64.7 23	4.93 24	6.8 16	20.91 35	47.1 12
15.6	33.50 28	68.6 9	26.57 96	67.3 26	5.14 21	8.7 19	21.22 31	48.4 13
25.5	33.74 24	69.6 10	27.35 78	70.2 29	5.32 18	10.8 21	21.49 27	49.8 14
Dec. 5.5	33.95 21	70.6 10	27.94 59	73.2 30	5.46 14	13.0 22	21.72 23	51.2 14
	16	11	38	31	10	22	18	15
15.5	34.11	71.7	28.32	76.3	5.56	15.2	21.90	52.7
25.5	34.22 11	72.7 10	28.48 16	79.4 31	5.62 6	17.3 21	22.01 11	54.1 14
35.4	34.27 5	73.7 10	28.41 7	82.4 30	5.64 2	19.4 21	22.06 5	55.5 14
Sec δ , Tan δ	1.276	+0.792	5.306	+5.211	1.042	-0.293	1.437	+1.032
Mean Place	28°.334	56''.65	11°.849	60''.75	1°.385	28''.01	15°.591	38''.17
D δ a, D ω a	+0.02	-0.01	+0.13	-0.08	-0.01	0.00	+0.03	-0.01
D δ δ , D ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Orionis. Mag. 0.3		λ Aurigæ. Mag. 4.8		τ Orionis. Mag. 3.7		\omicron Columbæ. Mag. 4.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 5 10	° ' " - 8 17	h m 5 13	° ' " +40 1	h m 5 13	° ' " - 6 55	h m 5 14	° ' " -34 58
Jan. 0.4	22.56	59.4	2.57	33.8	24.09	69.7	22.21	44.9
10.4	22.56	60.9	2.59	34.9	24.10	71.2	22.17	47.5
20.4	22.52	62.3	2.55	35.9	24.06	72.5	22.08	49.8
30.4	22.44	63.4	2.46	36.7	23.98	73.6	21.94	51.7
Feb. 9.3	22.32	64.3	2.33	37.3	23.87	74.5	21.77	53.2
19.3	22.18	65.0	2.16	37.8	23.73	75.2	21.56	54.3
Mar. 1.3	22.02	65.4	1.96	38.0	23.57	75.6	21.33	54.9
11.2	21.84	65.5	1.75	38.0	23.40	75.7	21.09	55.1
21.2	21.67	65.4	1.53	37.7	23.23	75.6	20.86	54.8
31.2	21.51	65.1	1.33	37.2	23.07	75.3	20.63	54.1
Apr. 10.2	21.37	64.5	1.16	36.5	22.93	74.8	20.42	52.9
20.1	21.25	63.7	1.02	35.6	22.81	74.0	20.24	51.3
30.1	21.17	62.6	0.93	34.6	22.72	73.0	20.10	49.4
May 10.1	21.13	61.3	0.89	33.5	22.68	71.8	20.01	47.2
20.1	21.13	59.8	0.90	32.4	22.68	70.3	19.96	44.7
30.0	21.17	58.1	0.97	31.4	22.72	68.7	19.96	41.9
June 9.0	21.25	56.3	1.10	30.4	22.80	67.0	20.01	39.0
19.0	21.38	54.4	1.28	29.5	22.93	65.2	20.11	36.0
28.9	21.54	52.5	1.51	28.8	23.09	63.3	20.25	33.0
July 8.9	21.74	50.5	1.78	28.2	23.29	61.5	20.44	30.1
18.9	21.97	48.6	2.09	27.7	23.51	59.7	20.67	27.3
28.9	22.22	46.9	2.42	27.4	23.76	58.0	20.93	24.8
Aug. 7.8	22.49	45.3	2.78	27.3	24.03	56.4	21.21	22.6
17.8	22.78	43.9	3.16	27.3	24.32	55.1	21.51	20.8
27.8	23.07	42.8	3.55	27.4	24.61	54.0	21.83	19.4
Sept. 6.8	23.37	42.1	3.94	27.7	24.91	53.3	22.16	18.6
16.7	23.67	41.7	4.34	28.1	25.21	52.9	22.49	18.3
26.7	23.96	41.7	4.73	28.6	25.50	52.9	22.81	18.6
Oct. 6.7	24.24	42.1	5.11	29.2	25.78	53.2	23.13	19.4
16.6	24.51	42.8	5.48	29.9	26.06	53.8	23.43	20.7
26.6	24.77	43.8	5.83	30.7	26.32	54.8	23.71	22.5
Nov. 5.6	25.01	45.1	6.15	31.6	26.56	56.1	23.96	24.8
15.6	25.22	46.6	6.45	32.6	26.77	57.6	24.17	27.4
25.5	25.40	48.3	6.71	33.6	26.96	59.2	24.35	30.3
Dec. 5.5	25.55	50.1	6.92	34.7	27.11	60.9	24.49	33.3
15.5	25.66	51.9	7.09	35.8	27.23	62.6	24.58	36.3
25.5	25.73	53.7	7.20	36.9	27.31	64.3	24.61	39.2
35.4	25.77	55.4	7.26	38.0	27.34	65.9	24.60	42.0
Sec δ , Tan δ	1.011	-0.146	1.306	+0.840	1.007	-0.122	1.220	-0.700
Mean Place	21 ^s .362	65 ^{''} .04	1 ^s .150	21 ^{''} .98	22 ^s .901	75 ^{''} .62	20 ^s .657	47 ^{''} .79
D' ψ α , D ω α	0.00	0.00	+0.02	-0.01	0.00	0.00	-0.02	+0.01
D ψ δ , D ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Orionis. Mag. 1.7		β Tauri. Mag. 1.8		17 Camelop. Mag. 5.8		β Leporis. Mag. 3.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 5 20 s	° ' " + 6 16 "	h m 5 20 s	° ' " +28 32 "	h m 5 21 s	° ' " +62 59 "	h m 5 24 s	° ' " -20 49 "
Jan. 0.4	29.01	25.5	48.75	15.8	59.46	58.5	32.38	36.5
10.4	29.04 3	24.7 8	48.78 3	16.3 5	59.46 0	60.8 23	32.38 0	38.6 21
20.4	29.02 2	24.0 7	48.76 2	16.7 4	59.36 10	62.9 21	32.33 5	40.5 19
30.4	28.96 6	23.4 6	48.70 6	17.1 4	59.18 18	64.8 19	32.24 9	42.2 17
Feb. 9.3	28.86 10	22.9 5	48.59 11	17.4 3	58.92 26	66.3 15	32.12 12	43.5 13
	13	4	15	2	32	11	16	9
19.3	28.73	22.5	48.44	17.6	58.60	67.4	31.96	44.4
Mar. 1.3	28.58 15	22.2 3	48.27 17	17.6 0	58.23 37	68.1 7	31.78 18	45.0 6
11.3	28.41 17	22.1 1	48.09 18	17.6 0	57.84 39	68.3 2	31.59 19	45.3 3
21.2	28.24 17	22.1 0	47.91 18	17.5 1	57.44 40	68.0 3	31.39 20	45.2 1
31.2	28.09 15	22.1 0	47.74 17	17.2 3	57.06 38	67.3 7	31.20 19	44.7 5
	14	2	15	4	33	11	17	8
Apr. 10.2	27.95	22.3	47.59	16.8	56.73	66.2	31.03	43.9
20.1	27.84 11	22.6 3	47.46 13	16.4 4	56.45 28	64.7 15	30.89 14	42.8 11
30.1	27.76 8	23.1 5	47.37 9	15.9 5	56.24 21	63.0 17	30.78 11	41.4 14
May 10.1	27.72 4	23.7 6	47.33 4	15.4 5	56.11 13	61.1 19	30.71 7	39.7 17
20.1	27.72 0	24.4 7	47.34 1	14.9 5	56.07 4	59.0 21	30.68 3	37.7 20
	5	9	6	4	6	22	1	22
30.0	27.77	25.3	47.40	14.5	56.13	56.8	30.69	35.5
June 9.0	27.86 9	26.3 10	47.51 11	14.2 3	56.27 14	54.6 22	30.75 6	33.1 24
19.0	27.99 13	27.4 11	47.66 15	14.0 2	56.50 23	52.5 21	30.85 10	30.7 24
29.0	28.16 17	28.5 11	47.86 20	13.9 1	56.81 31	50.6 19	31.00 15	28.2 25
July 8.9	28.36 20	29.7 12	48.09 23	13.9 0	57.20 39	48.8 18	31.18 18	25.8 24
	23	12	27	1	45	16	21	24
18.9	28.59	30.9	48.36	14.0	57.65	47.2	31.39	23.4
28.9	28.84 25	32.1 12	48.65 29	14.1 1	58.16 51	45.9 13	31.63 24	21.2 22
Aug. 7.8	29.11 27	33.2 11	48.96 31	14.3 2	58.71 55	44.9 10	31.89 26	19.3 19
17.8	29.40 29	34.1 9	49.29 33	14.6 3	59.30 59	44.2 7	32.17 28	17.7 16
27.8	29.70 30	34.9 8	49.63 34	15.0 4	59.91 61	43.8 4	32.47 30	16.4 13
	30	6	35	3	63	1	30	8
Sept. 6.8	30.00	35.5	49.98	15.3	60.54	43.7	32.77	15.6
16.7	30.31 31	35.9 4	50.33 35	15.7 4	61.17 63	43.9 2	33.07 30	15.2 4
26.7	30.61 30	36.1 2	50.67 34	16.0 3	61.80 63	44.5 6	33.37 30	15.3 1
Oct. 6.7	30.90 29	36.0 1	51.00 33	16.3 3	62.42 62	45.4 9	33.67 30	15.8 5
16.7	31.19 29	35.7 3	51.33 33	16.6 3	63.01 59	46.5 11	33.95 28	16.8 10
	27	5	31	4	56	14	27	15
26.6	31.46	35.2	51.64	17.0	63.57	47.9	34.22	18.3
Nov. 5.6	31.71 25	34.5 7	51.93 29	17.3 3	64.09 52	49.6 17	34.47 25	20.1 18
15.6	31.94 23	33.6 9	52.20 27	17.6 3	64.56 47	51.5 19	34.69 22	22.2 21
25.5	32.15 21	32.7 9	52.44 24	17.9 3	64.97 41	53.6 21	34.88 19	24.5 23
Dec. 5.5	32.32 17	31.7 10	52.64 20	18.3 4	65.30 33	55.9 23	35.04 16	26.9 24
	14	10	16	4	25	23	11	25
15.5	32.46	30.7	52.80	18.7	65.55	58.2	35.15	29.4
25.5	32.55 9	29.7 10	52.91 11	19.1 4	65.71 16	60.6 24	35.22 7	31.8 24
35.4	32.60 5	28.8 9	52.98 7	19.5 4	65.77 6	63.0 24	35.25 3	34.1 23
Sec δ , Tan δ	1.006	+0.110	1.138	+0.544	2.203	+1.962	1.070	-0.380
Mean Place	27°.843	17''.91	47°.470	5''.62	57°.004	45''.05	31°.059	41''.16
D δ α , D ω α	0.00	0.00	+0.01	-0.01	+0.05	-0.02	-0.01	0.00
D δ δ , D ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	χ Aurigæ. Mag. 4.9		δ Orionis. Mag. 2.5		Groombridge 986. Mag. 6.4		α Leporis. Mag. 2.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 5 27 s	° ' +32 7 "	h m 5 27 s	° ' - 0 21 "	h m 5 28 s	° ' +74 59 "	h m 5 28 s	° ' -17 52 "
Jan. 0.4	5.20	53.3	34.87	39.1	9.47	31.1	54.87	56.9
10.4	5.24 4	54.0 7	34.90 3	40.3 12	9.42 5	33.9 28	54.88 1	59.0 21
20.4	5.22 2	54.6 6	34.88 2	41.4 11	9.20 22	36.5 26	54.84 4	60.8 18
30.4	5.16 6	55.1 5	34.82 6	42.3 9	8.83 37	38.8 23	54.76 8	62.4 16
Feb. 9.3	5.05 11	55.6 5	34.72 10	43.0 7	8.33 50	40.7 19	54.64 12	63.7 13
	15	4	13	5	61	14	15	9
19.3	4.90	56.0	34.59	43.5	7.72	42.1	54.49	64.6
Mar. 1.3	4.73 17	56.2 2	34.44 15	43.9 4	7.03 69	43.0 9	54.31 18	65.2 6
11.3	4.54 19	56.2 0	34.27 17	44.1 2	6.30 73	43.4 4	54.12 19	65.5 3
21.2	4.35 19	56.0 2	34.10 17	44.1 0	5.57 73	43.2 2	53.93 19	65.4 1
31.2	4.17 18	55.7 3	33.94 16	43.9 2	4.87 70	42.5 7	53.75 18	65.0 4
	17	4	14	4	64	12	16	7
Apr. 10.2	4.00	55.3	33.80	43.5	4.23	41.3	53.59	64.3
20.1	3.87 13	54.8 5	33.68 12	43.0 5	3.68 55	39.7 16	53.45 14	63.3 10
30.1	3.78 9	54.2 6	33.59 9	42.3 7	3.24 44	37.7 20	53.34 11	61.9 14
May 10.1	3.73 5	53.6 6	33.54 5	41.4 9	2.94 30	35.4 23	53.27 7	60.3 16
20.1	3.73 0	53.0 6	33.53 1	40.4 10	2.79 15	32.9 25	53.24 3	58.5 18
	6	6	4	12	0	26	2	20
30.0	3.79	52.4	33.57	39.2	2.79	30.3	53.26	56.5
June 9.0	3.89 10	51.8 6	33.65 8	37.9 13	2.95 16	27.6 27	53.32 6	54.3 22
19.0	4.04 15	51.3 5	33.77 12	36.4 15	3.26 31	25.0 26	53.42 10	52.0 23
29.0	4.23 19	50.9 4	33.92 15	34.9 15	3.72 46	22.5 25	53.56 14	49.6 24
July 8.9	4.47 24	50.7 2	34.11 19	33.4 15	4.30 58	20.2 23	53.73 17	47.3 23
	27	1	22	15	71	20	21	22
18.9	4.74	50.6	34.33	31.9	5.01	18.2	53.94	45.1
28.9	5.03 29	50.5 1	34.58 25	30.5 14	5.82 81	16.4 18	54.18 24	43.0 21
Aug. 7.8	5.35 32	50.6 1	34.84 26	29.2 13	6.71 89	14.9 15	54.44 26	41.1 19
17.8	5.69 34	50.7 1	35.12 28	28.1 11	7.67 96	13.8 11	54.72 28	39.5 16
27.8	6.04 35	50.9 2	35.41 29	27.2 9	8.69 102	13.1 7	55.01 29	38.3 12
	36	3	30	7	105	3	30	8
Sept. 6.8	6.40	51.2	35.71	26.5	9.74	12.8	55.31	37.5
16.7	6.76 36	51.5 3	36.01 30	26.1 4	10.81 107	12.9 1	55.61 30	37.1 4
26.7	7.12 36	51.8 3	36.30 29	26.1 0	11.87 106	13.3 4	55.91 30	37.1 0
Oct. 6.7	7.47 35	52.1 3	36.59 29	26.3 2	12.92 105	14.2 9	56.20 29	37.6 5
16.7	7.81 34	52.5 4	36.88 29	26.8 5	13.93 101	15.5 13	56.48 28	38.5 9
	33	4	27	8	95	16	27	13
26.6	8.14	52.9	37.15	27.6	14.88	17.1	56.75	39.8
Nov. 5.6	8.45 31	53.3 4	37.40 25	28.6 10	15.75 87	19.1 20	57.00 25	41.5 17
15.6	8.73 28	53.7 4	37.63 23	29.8 12	16.53 78	21.4 23	57.23 23	43.5 20
25.5	8.98 25	54.2 5	37.84 21	31.1 13	17.20 67	23.9 25	57.43 20	45.7 22
Dec. 5.5	9.19 21	54.8 6	38.01 17	32.5 14	17.73 53	26.6 27	57.59 16	48.0 23
	17	6	13	14	38	29	12	23
15.5	9.36	55.4	38.14	33.9	18.11	29.5	57.71	50.3
25.5	9.49 13	56.0 6	38.24 10	35.2 13	18.33 22	32.4 29	57.79 8	52.6 23
35.4	9.56 7	56.7 7	38.29 5	36.5 13	18.38 5	35.2 28	57.82 3	54.8 22
Sec δ , Tan δ	1.181	+0.628	1.000	-0.006	3.861	+3.730	+1.051	-0.323
Mean Place	3 ^h .855	42 ^{''} .94	33 ^h .680	45 ^{''} .96	5 ^h .029	17 ^{''} .32	53 ^h .574	62 ^{''} .07
D' ψ α , D ω α	+0.02	-0.01	0.00	0.00	+0.10	-0.03	-0.01	0.00
D ψ δ , D ω δ	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0	+0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϕ^1 Orionis. Mag. 4.5		ι Orionis. Mag. 2.9		ϵ Orionis. Mag. 1.8		ζ Tauri. Mag. 3.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 5 30 s	° ' " + 9 25 "	h m 5 31 s	° ' " - 5 57 "	h m 5 31 s	° ' " - 1 15 "	h m 5 32 s	° ' " + 21 5 "
Jan. 0.5	3.80	60.9 6	11.84	52.4 15	49.10	17.2 13	27.92	34.0 0
10.4	3.83 3	60.3 6	11.86 2	53.9 15	49.13 3	18.5 13	27.97 5	34.0 0
20.4	3.82 1	59.7 6	11.84 2	55.2 13	49.11 2	19.6 11	27.97 0	34.1 0
30.4	3.77 5	59.2 5	11.78 6	56.3 11	49.05 6	20.5 9	27.92 5	34.1 0
Feb. 9.3	3.68 9	58.8 4	11.68 10	57.2 9	48.95 10	21.3 8	27.82 10	34.2 1
	13	3	13	7	12	6	13	0
19.3	3.55	58.5 2	11.55 16	57.9 5	48.83	21.9 4	27.69 15	34.2 0
Mar. 1.3	3.40 15	58.3 1	11.39 17	58.4 2	48.68 15	22.3 2	27.54 17	34.2 0
	16				17			
11.3	3.24 17	58.2 1	11.22 17	58.6 0	48.51 17	22.5 0	27.37 18	34.2 1
21.2	3.07 16	58.1 1	11.05 17	58.6 2	48.34 16	22.5 2	27.19 17	34.1 1
31.2	2.91 14	58.2 1	10.88 15	58.4 5	48.18 15	22.3 4	27.02 15	34.0 2
Apr. 10.2	2.77 12	58.3 2	10.73 12	57.9 7	48.03 12	21.9 5	26.87 12	33.8 1
20.2	2.65 8	58.5 3	10.61 10	57.2 9	47.91 12	21.4 7	26.75 8	33.7 1
30.1	2.57 5	58.8 4	10.51 6	56.3 11	47.82 9	20.7 9	26.67 5	33.6 1
May 10.1	2.52 0	59.2 6	10.45 1	55.2 13	47.77 1	19.8 11	26.62 0	33.5 1
20.1	2.52 4	59.8 7	10.44 3	53.9 15	47.76 3	18.7 13	26.62 4	33.4 0
30.0	2.56 8	60.5 8	10.47 7	52.4 16	47.79 7	17.4 14	26.66 9	33.4 1
June 9.0	2.64 13	61.3 8	10.54 11	50.8 17	47.86 11	16.0 14	26.75 13	33.5 2
19.0	2.77 16	62.1 9	10.65 15	49.1 17	47.97 15	14.6 15	26.88 18	33.7 3
29.0	2.93 20	63.0 10	10.80 18	47.4 18	48.12 19	13.1 16	27.06 21	34.0 3
July 8.9	3.13 23	64.0 10	10.98 21	45.6 18	48.31 22	11.5 15	27.27 24	34.3 4
18.9	3.36 25	65.0 10	11.19 24	43.8 16	48.53 24	10.0 14	27.51 27	34.7 4
28.9	3.61 27	66.0 9	11.43 26	42.2 15	48.77 26	8.6 13	27.78 29	35.1 4
Aug. 7.9	3.88 29	66.9 9	11.69 27	40.7 13	49.03 28	7.3 12	28.07 30	35.5 5
17.8	4.17 30	67.8 7	11.96 29	39.4 10	49.31 29	6.1 9	28.37 32	36.0 4
27.8	4.47 30	68.5 5	12.25 29	38.4 7	49.60 29	5.2 7	28.69 32	36.4 4
Sept. 6.8	4.77 31	69.0 4	12.54 30	37.7 4	49.89 30	4.5 4	29.01 33	36.8 3
16.7	5.08 30	69.4 1	12.84 29	37.3 1	50.19 30	4.1 1	29.34 32	37.1 2
26.7	5.38 30	69.5 1	13.13 29	37.2 3	50.49 29	4.0 3	29.66 32	37.3 1
Oct. 6.7	5.68 29	69.4 2	13.42 27	37.5 10	50.78 28	4.3 8	29.98 30	37.4 0
16.7	5.97 28	69.2 4	13.71 27	38.2 10	51.06 27	4.8 8	30.30 30	37.4 0
26.6	6.25 27	68.8 6	13.98 25	39.2 12	51.33 26	5.6 11	30.60 28	37.4 1
Nov. 5.6	6.52 24	68.2 8	14.23 23	40.4 15	51.59 24	6.7 13	30.88 26	37.3 2
15.6	6.76 22	67.4 8	14.46 21	41.9 16	51.83 21	8.0 14	31.14 24	37.1 2
25.6	6.98 18	66.6 8	14.67 17	43.5 17	52.04 17	9.4 14	31.38 20	36.9 1
Dec. 5.5	7.16 15	65.8 8	14.84 13	45.2 18	52.21 14	10.8 15	31.58 16	36.8 1
15.5	7.31 11	65.0 8	14.97 9	47.0 17	52.35 10	12.3 14	31.74 12	36.7 1
25.5	7.42 6	64.2 8	15.06 6	48.7 16	52.45 5	13.7 14	31.86 8	36.6 1
35.4	7.48	63.4	15.12	50.3	52.50	15.1	31.94	36.5
Sec δ , Tan δ	1.014	+0.166	1.005	-0.104	1.000	-0.022	1.072	+0.386
Mean Place	2 ^h .608	52'' .99	10 ^h .622	58'' .68	47 ^h .901	24'' .02	26 ^h .680	24'' .95
D ϕ α , D ω α	0.00	0.00	0.00	0.00	0.00	0.00	+0.01	0.00
D ϕ δ , D ω δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Orionis. Mag. 2.0		α Columbæ. Mag. 2.8		ο Aurigæ. Mag. 5.5		ζ Leporis. Mag. 3.7	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 5 36 s	° ' - 1 58 "	h m 5 36 s	° ' -34 6 "	h m 5 39 s	° ' +49 47 "	h m 5 43 s	° ' -14 50 "
Jan. 0.5	23.33	69.9	31.47	67.8	11.34	32.6	2.06	67.4
10.4	23.36 3	71.2 13	31.45 2	70.5 27	11.39 5	34.3 17	2.08 2	69.4 20
20.4	23.35 1	72.3 11	31.38 7	72.9 24	11.37 2	35.9 16	2.06 2	71.2 18
30.4	23.30 5	73.3 10	31.26 12	75.0 21	11.29 8	37.3 14	1.99 7	72.7 15
Feb. 9.3	23.20 10	74.1 8	31.10 16	76.7 17	11.14 15	38.5 12	1.89 10	73.9 12
	13	6	19	13	20	9	14	10
19.3	23.07	74.7	30.91	78.0	10.94	39.4	1.75	74.9
Mar. 1.3	22.92 15	75.2 5	30.69 22	78.9 9	10.70 24	40.0 6	1.58 17	75.6 7
11.3	22.75 17	75.4 2	30.46 23	79.3 4	10.45 25	40.3 3	1.40 18	76.0 4
21.2	22.58 17	75.4 0	30.22 24	79.2 1	10.19 26	40.2 1	1.22 18	76.0 0
31.2	22.42 16	75.2 2	29.99 23	78.7 5	9.93 26	39.8 4	1.04 18	75.7 3
	15	3	21	9	23	7	17	6
Apr. 10.2	22.27	74.9	29.78	77.8	9.70	39.1	0.87	75.1
20.2	22.15 12	74.3 6	29.59 19	76.4 14	9.51 19	38.2 9	0.73 14	74.2 9
30.1	22.06 9	73.5 8	29.44 15	74.7 17	9.36 15	37.0 12	0.62 11	73.1 11
May 10.1	22.00 6	72.6 9	29.33 11	72.6 21	9.27 9	35.6 14	0.55 7	71.7 14
20.1	21.98 2	71.5 11	29.26 7	70.3 23	9.24 3	34.1 15	0.51 4	70.1 16
	3	12	2	26	4	15	0	19
30.0	22.01	70.3	29.24	67.7	9.28	32.6	0.51	68.2
June 9.0	22.08 7	68.9 14	29.27 3	64.9 28	9.38 10	31.1 15	0.56 5	66.2 20
19.0	22.19 11	67.4 15	29.34 7	62.0 29	9.54 16	29.6 15	0.65 9	64.1 21
29.0	22.33 14	65.9 15	29.46 12	59.1 29	9.76 22	28.2 14	0.78 13	61.9 22
July 8.9	22.51 18	64.3 16	29.62 16	56.2 29	10.04 28	26.9 13	0.95 17	59.8 21
	21	16	20	28	32	12	20	21
18.9	22.72	62.7	29.82	53.4	10.36	25.7	1.15	57.7
28.9	22.96 24	61.2 15	30.06 24	50.8 26	10.72 36	24.8 9	1.37 22	55.7 20
Aug. 7.9	23.22 26	59.9 13	30.32 26	48.6 22	11.11 39	24.1 7	1.62 25	53.9 18
17.8	23.50 28	58.7 12	30.61 29	46.7 19	11.53 42	23.6 5	1.89 27	52.4 15
27.8	23.78 28	57.8 9	30.92 31	45.2 15	11.97 44	23.2 4	2.17 28	51.2 12
	29	6	32	10	46	2	29	8
Sept. 6.8	24.07	57.2	31.24	44.2	12.43	23.0	2.46	50.4
16.7	24.37 30	56.8 4	31.57 33	43.7 5	12.89 46	23.0 0	2.76 30	49.9 5
26.7	24.67 30	56.7 1	31.90 33	43.8 1	13.35 46	23.3 3	3.06 30	49.9 0
Oct. 6.7	24.96 29	57.0 3	32.22 32	44.5 7	13.80 45	23.8 5	3.36 30	50.3 4
16.7	25.25 29	57.6 6	32.53 31	45.7 12	14.24 44	24.4 6	3.65 29	51.2 9
	27	8	29	17	43	8	27	12
26.6	25.52	58.4	32.82	47.4	14.67	25.2	3.92	52.4
Nov. 5.6	25.78 26	59.5 11	33.09 27	49.6 22	15.07 40	26.2 10	4.18 26	54.0 16
15.6	26.02 24	60.8 13	33.33 24	52.1 25	15.44 37	27.4 12	4.42 24	55.8 18
25.6	26.23 21	62.3 15	33.53 20	54.9 28	15.77 33	28.8 14	4.63 21	57.9 21
Dec. 5.5	26.41 18	63.8 15	33.69 16	57.9 30	16.05 28	30.3 15	4.80 17	60.1 22
	14	15	12	30	23	16	14	22
15.5	26.55	65.3	33.81	60.9	16.28	31.9	4.94	62.3
25.5	26.65 10	66.8 15	33.87 6	63.9 30	16.44 16	33.5 16	5.04 10	64.5 22
35.4	26.72 7	68.2 14	33.88 1	66.7 28	16.54 10	35.2 17	5.09 5	66.6 21
Sec δ, Tan δ	1.001	-0.035	1.208	-0.677	1.549	+1.183	1.035	-0.265
Mean Place	22°.119	76''.63	29°.919	72''.02	9°.527	21''.25	0°.773	73''.23
D'ψ α, Dω α	0.00	0.00	-0.02	0.00	+0.03	-0.01	-0.01	0.00
Dψ δ, Dω δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Orionis. Var. 1.0-1.4		δ Aurigæ. Mag. 3.9		γ Leporis. Mag. 3.8		β Aurigæ. Mag. 2.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 5 50	° ' " + 7 23	h m 5 52	° ' " +54 16	h m 5 52	° ' " -14 10	h m 5 53	° ' " +44 56
Jan. 0.5	28.92	37.6	23.96	56.4	27.82	52.4	10.57	33.2
10.4	28.97 5	36.7 9	24.03 7	58.3 19	27.85 3	54.3 19	10.64 7	34.6 14
20.4	28.97 0	36.0 7	24.02 1	60.1 18	27.84 1	56.1 18	10.65 1	35.9 13
30.4	28.93 4	35.4 6	23.93 9	61.8 17	27.78 6	57.7 16	10.59 6	37.1 12
Feb. 9.4	28.85 8	34.9 5	23.78 15	63.2 14	27.68 10	59.0 13	10.47 12	38.2 11
	11 4		21 12		13 10		16 9	
19.3	28.74	34.5	23.57	64.4	27.55	60.0	10.31	39.1
Mar. 1.3	28.60 14	34.3 2	23.31 26	65.2 8	27.39 16	60.7 7	10.11 20	39.7 6
11.3	28.44 16	34.2 1	23.02 29	65.7 5	27.21 18	61.1 4	9.88 23	40.0 3
21.2	28.27 17	34.1 1	22.73 29	65.8 1	27.03 18	61.1 0	9.64 24	40.1 1
31.2	28.11 16	34.2 1	22.44 29	65.5 3	26.85 18	60.9 2	9.41 23	39.9 2
	15 2		27 7		17 5		21 5	
Apr. 10.2	27.96	34.4	22.17	64.8	26.68	60.4	9.20	39.4
20.2	27.83 13	34.6 2	21.94 23	63.8 10	26.53 15	59.6 8	9.02 18	38.7 7
30.1	27.73 10	35.0 4	21.76 18	62.6 12	26.41 12	58.5 11	8.88 14	37.8 9
May 10.1	27.67 6	35.5 5	21.64 12	61.1 15	26.33 8	57.2 13	8.79 9	36.7 11
20.1	27.65 2	36.1 6	21.59 5	59.5 16	26.29 4	55.6 16	8.75 4	35.5 12
	2 8		1 17		0 18		2 13	
30.1	27.67	36.9	21.60	57.8	26.29	53.8	8.77	34.2
June 9.0	27.73 6	37.7 8	21.68 8	56.0 18	26.34 5	51.8 20	8.85 8	32.9 13
19.0	27.84 11	38.6 9	21.83 15	54.2 18	26.42 8	49.8 20	8.98 13	31.6 13
29.0	27.98 14	39.6 10	22.05 22	52.5 17	26.54 12	47.7 21	9.17 19	30.4 12
July 8.9	28.16 18	40.6 10	22.33 28	50.9 16	26.70 16	45.6 21	9.41 24	29.3 11
	21 11		33 14		19 21		29 10	
18.9	28.37	41.7	22.66	49.5	26.89	43.5	9.70	28.3
28.9	28.60 23	42.7 10	23.03 37	48.3 12	27.11 22	41.5 20	10.02 32	27.4 9
Aug. 7.9	28.86 26	43.6 9	23.45 42	47.2 11	27.35 24	39.8 17	10.37 35	26.7 7
17.8	29.14 28	44.4 8	23.90 45	46.3 9	27.61 26	38.3 15	10.75 38	26.2 5
27.8	29.43 29	45.0 6	24.37 47	45.6 7	27.89 28	37.1 12	11.15 40	25.8 4
	29 5		49 4		29 9		41 3	
Sept. 6.8	29.72	45.5	24.86	45.2	28.18	36.2	11.56	25.5
16.8	30.02 30	45.8 3	25.36 50	45.0 2	28.47 29	35.8 4	11.98 42	25.4 1
26.7	30.33 31	45.9 1	25.87 51	45.1 1	28.77 30	35.8 0	12.40 42	25.5 1
Oct. 6.7	30.63 30	45.7 2	26.37 50	45.4 3	29.07 30	36.2 4	12.82 42	25.7 2
16.7	30.93 30	45.3 4	26.86 49	46.0 6	29.36 29	37.0 8	13.24 42	26.1 4
	29 6		48 8		28 12		40 5	
26.6	31.22	44.7	27.34	46.8	29.64	38.2	13.64	26.6
Nov. 5.6	31.49 27	43.9 8	27.79 45	47.8 10	29.91 27	39.7 15	14.02 38	27.3 7
15.6	31.75 26	43.0 9	28.21 42	49.0 12	30.15 24	41.5 18	14.38 36	28.2 9
25.6	31.98 23	42.0 10	28.59 38	50.5 15	30.37 22	43.6 21	14.71 33	29.2 10
Dec. 5.5	32.18 20	41.0 10	28.91 32	52.1 16	30.56 19	45.8 22	14.99 28	30.3 11
	17 10		26 18		15 22		23 12	
15.5	32.35	40.0	29.17	53.9	30.71	48.0	15.22	31.5
25.5	32.47 12	39.0 10	29.37 20	55.7 18	30.81 10	50.2 22	15.39 17	32.8 13
35.5	32.55 8	38.1 9	29.49 12	57.6 19	30.87 6	52.3 21	15.50 11	34.2 14
Sec δ , Tan δ	1.008	+0.130	1.713	+1.391	1.031	-0.253	1.413	+0.998
Mean Place	27°.691	29''.98	21°.869	45''.53	26°.532	58''.44	8°.857	22''.89
D' ψ α , D ω α	0.00	0.00	+0.04	0.00	-0.01	0.00	+0.03	0.00
D' ψ δ , D ω δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aurigæ. Mag. 2.7		1 Geminorum. Mag. 4.3		1 Puppis (G.). Mag. 6.2		γ Orionis. Mag. 4.4	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 5 53	° ' +37 12	h m 5 58	° ' +23 16	h m 6 1	° ' -45 1	h m 6 2	° ' +14 46
	s	"	s	"	s	"	s	"
Jan. 0.5	48.84	36.5	51.25	16.5	60.01	64.7	37.58	54.8
10.4	48.91 7	37.4 9	51.32 7	16.6 1	59.99 2	67.9 32	37.65 7	54.4 4
20.4	48.92 1	38.3 9	51.34 2	16.7 1	59.91 8	70.8 29	37.67 2	54.0 4
30.4	48.88 4	39.2 9	51.31 3	16.9 2	59.78 13	73.3 25	37.64 3	53.7 3
Feb. 9.4	48.78 10	40.0 8	51.23 8	17.1 2	59.59 19	75.5 22	37.57 7	53.6 1
	14	6	12	1	23	17	11	1
19.3	48.64	40.6	51.11	17.2	59.36	77.2	37.46	53.5
Mar. 1.3	48.47 17	41.1 5	50.96 15	17.4 2	59.09 27	78.4 12	37.32 14	53.4 1
11.3	48.27 20	41.4 3	50.79 17	17.5 1	58.80 29	79.1 7	37.16 16	53.4 0
21.3	48.06 21	41.4 0	50.62 17	17.5 0	58.51 29	79.4 3	36.99 17	53.4 0
31.2	47.86 20	41.2 2	50.45 17	17.4 1	58.22 29	79.1 3	36.82 17	53.4 0
	19	3	16	1	28	8	15	0
Apr. 10.2	47.67	40.9	50.29	17.3	57.94	78.3	36.67	53.4
20.2	47.51 16	40.4 5	50.15 14	17.2 1	57.68 26	77.1 12	36.54 13	53.5 1
30.1	47.39 12	39.7 7	50.05 10	17.0 2	57.46 22	75.5 16	36.44 10	53.6 1
May 10.1	47.32 7	38.9 8	49.98 7	16.9 1	57.28 18	73.4 21	36.37 7	53.8 2
20.1	47.29 3	38.0 9	49.95 3	16.7 2	57.15 13	71.0 24	36.34 3	54.1 3
	2	9	2	1	8	27	1	3
30.1	47.31	37.1	49.97	16.6	57.07	68.3	36.35	54.4
June 9.0	47.39 8	36.3 8	50.04 7	16.5 1	57.04 3	65.3 30	36.41 6	54.8 4
19.0	47.52 13	35.5 8	50.15 11	16.4 1	57.06 2	62.2 31	36.51 10	55.2 4
29.0	47.69 17	34.7 8	50.30 15	16.5 1	57.13 7	59.0 32	36.65 14	55.7 5
July 9.0	47.91 22	34.0 7	50.49 19	16.6 1	57.26 13	55.9 31	36.82 17	56.3 6
	26	6	22	1	18	30	21	6
18.9	48.17	33.4	50.71	16.7	57.44	52.9	37.03	56.9
28.9	48.46 29	32.9 5	50.96 25	16.8 1	57.67 23	50.0 29	37.26 23	57.5 6
Aug. 7.9	48.78 32	32.5 4	51.24 28	17.0 2	57.93 26	47.4 26	37.52 26	58.0 5
17.8	49.12 34	32.2 3	51.54 30	17.2 2	58.22 29	45.2 22	37.80 28	58.5 5
27.8	49.48 36	32.0 2	51.85 31	17.4 2	58.54 32	43.4 18	38.10 30	58.9 4
	37	1	32	1	35	13	30	3
Sept. 6.8	49.85	31.9	52.17	17.5	58.89	42.1	38.40	59.2
16.8	50.23 38	31.9 0	52.50 33	17.6 1	59.25 36	41.4 7	38.71 31	59.3 1
26.7	50.61 38	32.0 1	52.83 33	17.6 0	59.61 36	41.3 1	39.02 31	59.3 0
Oct. 6.7	50.99 38	32.1 1	53.16 33	17.5 1	59.98 37	41.9 6	39.34 32	59.2 1
16.7	51.36 37	32.3 2	53.49 33	17.4 1	60.34 36	43.0 11	39.65 31	58.9 3
	36	3	32	2	34	17	30	5
26.7	51.72	32.6	53.81	17.2	60.68	44.7	39.95	58.4
Nov. 5.6	52.07 35	33.0 4	54.11 30	17.0 2	60.99 31	47.0 23	40.24 29	57.9 5
15.6	52.40 33	33.4 4	54.40 29	16.8 2	61.27 28	49.7 27	40.52 28	57.3 6
25.6	52.69 29	34.0 6	54.66 26	16.6 2	61.51 24	52.7 30	40.77 25	56.6 7
Dec. 5.5	52.94 25	34.7 7	54.89 23	16.5 1	61.70 19	55.9 32	40.99 22	55.9 7
	21	8	19	1	14	34	19	6
15.5	53.15	35.5	55.08	16.4	61.84	59.3	41.18	55.3
25.5	53.31 16	36.4 9	55.23 15	16.3 1	61.92 8	62.7 34	41.32 14	54.7 6
35.5	53.42 11	37.3 9	55.34 11	16.4 1	61.94 2	66.0 33	41.42 10	54.2 5
Sec δ, Tan δ	1.256	+0.759	1.089	+0.430	1.415	-1.001	1.034	+0.264
Mean Place	47°.318	26''.80	49°.915	7''.90	58°.179	70''.00	36°.305	46''.84
D ₁ α, D ₂ α	+0.02	0.00	+0.01	0.00	-0.03	0.00	+0.01	0.00
D ₁ δ, D ₂ δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	22 H. Camelop. Mag. 4.7		17 Geminorum. Var. 3.2-4.2		2 Lynceis. Mag. 4.4		♄ Canis Majoris. Mag. 3.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 6 9	° ' +69 21	h m 6 9	° ' +22 31	h m 6 11	° ' +59 2	h m 6 16	° ' -30 1
	s	"	s	"	s	"	s	"
Jan. 0.5	19.41	17.6	38.95	66.6	59.50	47.4	59.78	21.6
10.5	19.51 10	20.2 26	39.03 8	66.6 0	59.61 11	49.5 21	59.82 4	24.4 28
20.4	19.48 3	22.7 25	39.06 3	66.7 1	59.62 1	51.6 21	59.80 2	27.0 26
30.4	19.33 15	25.1 24	39.04 2	66.8 1	59.55 7	53.6 20	59.73 7	29.3 23
Feb. 9.4	19.06 27	27.2 21	38.97 7	67.0 2	59.39 16	55.3 17	59.62 11	31.2 19
	36	17	11	2	23	15	16	16
19.3	18.70	28.9	38.86	67.2	59.16	56.8	59.46	32.8
Mar. 1.3	18.26 44	30.2 13	38.72 14	67.3 1	58.88 28	57.9 11	59.27 19	34.0 12
11.3	17.76 50	31.0 8	38.56 16	67.4 1	58.56 32	58.6 7	59.06 21	34.8 8
21.3	17.24 52	31.4 4	38.39 17	67.5 1	58.22 34	59.0 4	58.84 22	35.1 3
31.2	16.72 52	31.2 2	38.21 18	67.5 0	57.88 34	58.9 1	58.62 22	35.0 1
	49	7	16	0	32	5	21	5
Apr. 10.2	16.23	30.5	38.05	67.5	57.56	58.4	58.41	34.5
20.2	15.79 44	29.4 11	37.91 14	67.4 1	57.28 28	57.5 9	58.22 19	33.6 9
30.2	15.42 37	27.9 15	37.80 11	67.3 1	57.04 24	56.2 13	58.05 17	32.3 13
May 10.1	15.14 28	26.1 18	37.72 8	67.2 1	56.86 18	54.7 15	57.92 13	30.7 16
20.1	14.96 18	24.0 21	37.69 3	67.1 1	56.76 10	53.0 17	57.83 9	28.7 20
	8	23	1	1	2	19	5	22
30.1	14.88	21.7	37.70	67.0	56.74	51.1	57.78	26.5
June 9.0	14.92 4	19.2 25	37.75 5	66.9 1	56.79 5	49.1 20	57.78 0	24.1 24
19.0	15.07 15	16.7 25	37.85 10	66.9 0	56.91 12	47.1 20	57.82 4	21.5 26
29.0	15.32 25	14.3 24	37.99 14	66.9 0	57.11 20	45.1 20	57.90 8	18.8 27
July 9.0	15.68 36	11.9 24	38.17 18	67.0 1	57.38 27	43.2 19	58.02 12	16.1 27
	45	23	21	1	33	18	16	26
18.9	16.13	9.6	38.38	67.1	57.71	41.4	58.18	13.5
28.9	16.67 54	7.6 20	38.62 24	67.3 2	58.10 39	39.7 17	58.38 20	11.0 25
Aug. 7.9	17.28 61	5.8 18	38.89 27	67.4 1	58.54 44	38.2 15	58.61 23	8.7 23
17.9	17.95 67	4.3 15	39.17 28	67.5 1	59.02 48	37.0 12	58.86 25	6.7 20
27.8	18.67 72	3.1 12	39.47 30	67.6 1	59.53 51	36.0 10	59.14 28	5.1 16
	76	9	32	1	54	8	30	11
Sept. 6.8	19.43	2.2	39.79	67.7	60.07	35.2	59.44	4.0
16.8	20.22 79	1.6 6	40.12 33	67.7 0	60.63 56	34.7 5	59.75 31	3.3 7
26.7	21.02 80	1.4 2	40.45 33	67.6 1	61.19 56	34.5 2	60.06 31	3.1 2
Oct. 6.7	21.82 80	1.6 2	40.78 33	67.5 1	61.76 57	34.6 1	60.38 32	3.5 4
16.7	22.62 80	2.1 5	41.11 33	67.3 2	62.32 56	35.0 4	60.70 32	4.4 9
	77	9	32	3	55	6	31	15
26.7	23.39	3.0	41.43	67.0	62.87	35.6	61.01	5.9
Nov. 5.6	24.12 73	4.3 13	41.74 31	66.7 3	63.39 52	36.5 9	61.30 29	7.8 19
15.6	24.80 68	5.9 16	42.03 29	66.4 3	63.88 49	37.7 12	61.57 27	10.1 23
25.6	25.40 60	7.8 19	42.30 27	66.1 3	64.33 45	39.2 15	61.81 24	12.7 26
Dec. 5.6	25.92 52	10.0 22	42.54 24	65.8 3	64.72 39	40.9 17	62.02 21	15.6 29
	42	24	20	2	32	19	16	30
15.5	26.34	12.4	42.74	65.6	65.04	42.8	62.18	18.6
25.5	26.64 30	14.9 25	42.90 16	65.5 1	65.28 24	44.8 20	62.29 11	21.6 30
35.5	26.82 18	17.5 26	43.02 12	65.5 0	65.44 16	46.9 21	62.36 7	24.5 29
Sec δ, Tan δ	2.836	+2.654	1.083	+0.415	1.944	+1.667	1.155	-0.578
Mean Place	15°.751	7''.24	37°.608	58''.39	57°.010	37''.64	58°.322	27''.97
D'ψ α, Dω α	+0.07	+0.01	+0.01	0.00	+0.05	+0.01	-0.02	0.00
Dψ δ, Dω δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Geminorum. Mag. 3.2		ψ^1 Aurigæ. Mag. 5.1		β Canis Majoris. Mag. 2.0		δ Monocerotis. Mag. 4.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 6 17 s	° ' " +22 33 "	h m 6 18 s	° ' " +49 19 "	h m 6 18 s	° ' " -17 54 "	h m 6 19 s	° ' " + 4 38 "
Jan. 0.5	43.22	40.9	14.00	69.4	53.41	36.4	10.76	23.5
10.5	43.31 9	40.9 0	14.11 11	71.0 16	53.46 5	38.7 23	10.83 7	22.4 11
20.4	43.35 4	41.0 1	14.15 4	72.6 16	53.46 0	40.8 21	10.86 3	21.4 10
30.4	43.33 2	41.1 1	14.11 4	74.1 15	53.42 4	42.7 19	10.84 2	20.6 8
Feb. 9.4	43.27 6	41.3 2	14.01 10	75.5 14	53.33 9	44.3 16	10.78 6	20.0 6
	10	2	16	12	12	12	10	5
19.3	43.17	41.5	13.85	76.7	53.21	45.5	10.68	19.5
Mar. 1.3	43.03 14	41.7 2	13.64 21	77.7 10	53.06 15	46.4 9	10.55 13	19.2 3
	16	1	24	6	18	6	15	2
11.3	42.87	41.8 1	13.40 24	78.3 6	52.88 18	47.0 6	10.40 15	19.0 2
21.3	42.70 17	41.9 1	13.15 25	78.6 3	52.69 19	47.3 3	10.24 16	18.9 1
31.2	42.53 17	42.0 1	12.89 26	78.6 0	52.50 19	47.2 1	10.07 17	19.0 1
	17	0	25	3	18	4	16	2
Apr. 10.2	42.36	42.0	12.64	78.3	52.32	46.8	9.91	19.2
20.2	42.21 15	41.9 1	12.42 22	77.7 6	52.16 16	46.1 7	9.77 14	19.5 3
30.2	42.10 11	41.8 1	12.24 18	76.8 9	52.03 13	45.1 10	9.66 11	19.9 4
May 10.1	42.02 8	41.7 1	12.11 13	75.6 12	51.93 10	43.8 13	9.58 8	20.5 6
20.1	41.98 4	41.6 1	12.04 7	74.3 13	51.86 7	42.2 16	9.54 4	21.2 7
	0	1	1	14	3	18	1	8
30.1	41.98	41.5	12.03	72.9	51.83	40.4	9.53	22.0
June 9.0	42.03 5	41.4 1	12.07 4	71.4 15	51.84 1	38.4 20	9.57 4	22.9 9
19.0	42.12 9	41.3 1	12.18 11	69.8 16	51.89 5	36.3 21	9.65 8	23.9 10
29.0	42.25 13	41.3 0	12.35 17	68.3 15	51.98 9	34.1 22	9.76 11	24.9 10
July 9.0	42.42 17	41.4 1	12.57 22	66.8 15	52.11 13	31.9 22	9.91 15	26.0 11
	21	1	27	14	17	21	18	11
18.9	42.63	41.5	12.84	65.4	52.28	29.8	10.09	27.1
28.9	42.86 23	41.5 0	13.16 32	64.1 13	52.48 20	27.7 21	10.30 21	28.1 10
Aug. 7.9	43.12 26	41.6 1	13.51 35	63.0 11	52.70 22	25.8 19	10.53 23	29.0 9
	28	1	38	10	25	16	26	8
17.9	43.40	41.7 1	13.89 38	62.0 10	52.95 25	24.2 16	10.79 26	29.8 8
27.8	43.70 30	41.8 1	14.30 41	61.2 8	53.22 27	22.9 13	11.06 27	30.5 7
	32	0	43	6	28	10	29	5
Sept. 6.8	44.02	41.8	14.73	60.6	53.50	21.9	11.35	31.0
16.8	44.34 32	41.7 1	15.18 45	60.1 5	53.79 29	21.3 6	11.64 29	31.2 2
26.7	44.67 33	41.5 2	15.63 45	59.8 3	54.09 30	21.2 1	11.94 30	31.1 1
Oct. 6.7	45.00 33	41.3 2	16.09 46	59.7 1	54.39 30	21.6 4	12.25 31	30.8 3
16.7	45.33 33	41.1 2	16.55 46	59.9 2	54.69 30	22.4 8	12.55 30	30.3 5
	33	3	45	3	30	13	30	8
26.7	45.66	40.8	17.00	60.2	54.99	23.7	12.85	29.5
Nov. 5.6	45.98 32	40.4 4	17.43 43	60.7 5	55.28 29	25.3 16	13.14 29	28.5 10
15.6	46.28 30	40.0 4	17.84 41	61.5 8	55.54 26	27.3 20	13.41 27	27.3 12
25.6	46.55 27	39.6 4	18.21 37	62.5 10	55.78 24	29.5 22	13.66 25	26.1 12
Dec. 5.6	46.80 25	39.3 3	18.54 33	63.7 12	55.99 21	31.9 24	13.88 22	24.8 13
	21	2	28	13	17	25	19	13
15.5	47.01	39.1	18.82	65.0	56.16	34.4	14.07	23.5
25.5	47.18 17	39.0 1	19.04 22	66.5 15	56.29 13	36.9 25	14.22 15	22.3 12
35.5	47.30 12	38.9 1	19.19 15	68.1 16	56.37 8	39.3 24	14.33 11	21.1 12
Sec δ , Tan δ	1.083	+0.415	1.535	+1.164	1.051	-0.323	1.003	+0.081
Mean Place	41°.863	32''.99	12°.034	60''.45	52°.089	43''.07	9°.504	16''.24
$D^{\circ} \alpha$, $D_{\infty} \alpha$	+0.01	0.00	+0.03	+0.01	-0.01	0.00	0.00	0.00
$D^{\circ} \delta$, $D_{\infty} \delta$	0.0	+1.0	0.0	+1.0	0.0	+1.0	0.0	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Argus. Mag. -0.9		10 Monocerotis. Mag. 5.0		γ Geminorum. Mag. 4.1		8 Lynxis. Mag. 6.0	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 6 21	° ' -52 38	h m 6 23	° ' - 4 42	h m 6 23	° ' +20 16	h m 6 29	° ' +61 33
	s	"	s	"	s	"	s	"
Jan. 0.5	63.36	45.8	41.12	20.3	49.20	12.8	47.44	40.8
10.5	63.34 ²	49.2 ³⁴	41.19 ⁷	21.9 ¹⁶	49.29 ⁹	12.7 ¹	47.58 ¹⁴	43.1 ²³
20.4	63.25 ⁹	52.4 ³²	41.21 ²	23.3 ¹⁴	49.33 ⁴	12.6 ¹	47.62 ⁴	45.3 ²²
30.4	63.09 ¹⁶	55.3 ²⁹	41.19 ²	24.6 ¹³	49.33 ⁰	12.6 ⁰	47.56 ⁶	47.4 ²¹
Feb. 9.4	62.87 ²²	57.8 ²⁵	41.13 ⁶	25.7 ¹¹	49.27 ⁶	12.7 ¹	47.41 ¹⁵	49.4 ²⁰
	27	20	10	8	10	1	22	17
19.4	62.60	59.8	41.03	26.5	49.17	12.8	47.19	51.1
Mar. 1.3	62.29 ³¹	61.4 ¹⁶	40.89 ¹⁴	27.1 ⁶	49.04 ¹³	13.0 ²	46.90 ²⁹	52.4 ¹³
11.3	61.95 ³⁴	62.5 ¹¹	40.73 ¹⁶	27.5 ⁴	48.88 ¹⁶	13.1 ¹	46.56 ³⁴	53.4 ¹⁰
21.3	61.60 ³⁵	63.0 ⁵	40.56 ¹⁷	27.7 ²	48.71 ¹⁷	13.2 ¹	46.19 ³⁷	53.9 ⁵
31.2	61.24 ³⁶	63.0 ⁰	40.39 ¹⁷	27.7 ⁰	48.54 ¹⁷	13.3 ¹	45.82 ³⁷	54.0 ¹
	35	5	16	3	16	0	36	3
Apr. 10.2	60.89	62.5	40.23	27.4	48.38	13.3	45.46	53.7
20.2	60.56 ³³	61.5 ¹⁰	40.09 ¹⁴	26.9 ⁵	48.24 ¹⁴	13.3 ⁰	45.14 ³²	52.9 ⁸
30.2	60.27 ²⁹	60.0 ¹⁵	39.97 ¹²	26.2 ⁷	48.12 ¹²	13.3 ⁰	44.86 ²⁸	51.7 ¹²
May 10.1	60.02 ²⁵	58.0 ²⁰	39.88 ⁹	25.3 ⁹	48.03 ⁹	13.3 ⁰	44.64 ²²	50.2 ¹⁵
20.1	59.82 ²⁰	55.7 ²³	39.82 ⁶	24.3 ¹⁰	47.99 ⁴	13.3 ⁰	44.50 ¹⁴	48.5 ¹⁷
	14	26	1	12	0	0	7	19
30.1	59.68	53.1	39.81	23.1	47.99	13.3	44.43	46.6
June 9.1	59.59 ⁹	50.2 ²⁹	39.83 ²	21.7 ¹⁴	48.03 ⁴	13.3 ⁰	44.44 ¹	44.5 ²¹
19.0	59.56 ³	47.1 ³¹	39.90 ⁷	20.2 ¹⁵	48.11 ⁸	13.4 ¹	44.53 ⁹	42.4 ²¹
29.0	59.60 ⁴	43.9 ³²	40.00 ¹⁰	18.7 ¹⁵	48.24 ¹³	13.5 ¹	44.71 ¹⁸	40.2 ²²
July 9.0	59.69 ⁹	40.6 ³³	40.13 ¹³	17.2 ¹⁵	48.40 ¹⁶	13.7 ²	44.96 ²⁵	38.0 ²²
	15	32	17	16	19	2	32	21
18.9	59.84	37.4	40.30	15.6	48.59	13.9	45.28	35.9
28.9	60.05 ²¹	34.3 ³¹	40.50 ²⁰	14.1 ¹⁵	48.82 ²³	14.1 ²	45.66 ³⁸	34.0 ¹⁹
Aug. 7.9	60.31 ²⁶	31.5 ²⁸	40.73 ²³	12.8 ¹³	49.07 ²⁵	14.3 ²	46.10 ⁴⁴	32.3 ¹⁷
17.9	60.61 ³⁰	29.1 ²⁴	40.97 ²⁴	11.6 ¹²	49.34 ²⁷	14.4 ¹	46.59 ⁴⁹	30.8 ¹⁵
27.8	60.95 ³⁴	27.1 ²⁰	41.23 ²⁶	10.7 ⁹	49.63 ²⁹	14.5 ¹	47.12 ⁵³	29.5 ¹³
	37	15	28	7	31	0	56	11
Sept. 6.8	61.32	25.6	41.51	10.0	49.94	14.5	47.68	28.4
16.8	61.72 ⁴⁰	24.7 ⁹	41.80 ²⁹	9.6 ⁴	50.25 ³¹	14.4 ¹	48.26 ⁵⁸	27.6 ⁸
26.8	62.13 ⁴¹	24.4 ³	42.10 ³⁰	9.6 ⁰	50.57 ³²	14.3 ¹	48.86 ⁶⁰	27.1 ⁵
Oct. 6.7	62.54 ⁴¹	24.8 ⁴	42.40 ³⁰	9.9 ³	50.90 ³³	14.0 ³	49.47 ⁶¹	26.9 ²
16.7	62.95 ⁴¹	25.8 ¹⁰	42.70 ³⁰	10.6 ⁷	51.23 ³³	13.6 ⁴	50.08 ⁶¹	27.0 ¹
	39	16	29	10	32	4	60	4
26.7	63.34	27.4	42.99	11.6	51.55	13.2	50.68	27.4
Nov. 5.6	63.71 ³⁷	29.5 ²¹	43.27 ²⁸	12.9 ¹³	51.86 ³¹	12.7 ⁵	51.26 ⁵⁸	28.1 ⁷
15.6	64.04 ³³	32.2 ²⁷	43.54 ²⁷	14.4 ¹⁵	52.16 ³⁰	12.2 ⁵	51.81 ⁵⁵	29.2 ¹¹
25.6	64.32 ²⁸	35.3 ³¹	43.79 ²⁵	16.1 ¹⁷	52.44 ²⁸	11.7 ⁵	52.31 ⁵⁰	30.6 ¹⁴
Dec. 5.6	64.55 ²³	38.7 ³⁴	44.01 ²²	17.9 ¹⁸	52.69 ²⁵	11.2 ⁵	52.75 ⁴⁴	32.2 ¹⁶
	17	35	19	18	21	4	37	19
15.5	64.72	42.2	44.20	19.7	52.90	10.8	53.12	34.1
25.5	64.81 ⁹	45.8 ³⁶	44.35 ¹⁵	21.5 ¹⁸	53.07 ¹⁷	10.5 ³	53.41 ²⁹	36.2 ²¹
35.5	64.84 ³	49.3 ³⁵	44.45 ¹⁰	23.3 ¹⁸	53.20 ¹³	10.3 ²	53.61 ²⁰	38.4 ²²
Sec δ , Tan δ	1.648	-1.310	1.003	-0.082	1.066	+0.369	2.100	+1.846
Mean Place	61°.238	52'' .37	39°.862	27'' .26	47°.853	5'' .17	44°.636	32'' .38
D' ψ α , D ω α	-0.03	-0.01	0.00	0.00	+0.01	0.00	+0.05	+0.02
D ψ δ , D ω δ	0.0	+1.0	0.0	+1.0	0.0	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	23 H. Camelop. Mag. 5.6		ξ ² Canis Majoris. Mag. 4.5		51 Aurigæ. Mag. 5.7		γ Geminorum. Mag. 1.9	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 6 31 s	° ' +79 39 "	h m 6 31 s	° ' -22 53 "	h m 6 32 s	° ' +39 28 "	h m 6 32 s	° ' +16 28 "
Jan. 0.5	32.02	48.3	25.98	34.0	39.58	14.4	42.51	35.0
10.5	32.24 22	51.3 30	26.04 6	36.6 26	39.69 11	15.4 10	42.61 10	34.6 4
20.4	32.20 4	54.3 30	26.05 1	39.0 24	39.75 6	16.5 11	42.66 5	34.3 3
30.4	31.92 28	57.1 28	26.01 4	41.1 21	39.75 0	17.6 11	42.66 0	34.1 2
Feb. 9.4	31.41 51	59.6 25	25.92 9	42.9 18	39.69 6	18.6 10	42.61 5	34.0 1
	71	21	13	15	12	9	9	0
19.4	30.70	61.7	25.79	44.4	39.57	19.5	42.52	34.0
Mar. 1.3	29.83 87	63.4 17	25.63 16	45.6 12	39.41 16	20.2 7	42.40 12	34.0 0
11.3	28.84 99	64.6 12	25.45 18	46.4 8	39.22 19	20.8 6	42.25 15	34.1 1
21.3	27.78 106	65.3 7	25.26 19	46.8 4	39.02 20	21.2 4	42.08 17	34.2 1
31.2	26.70 108	65.4 1	25.06 20	46.8 0	38.81 21	21.3 1	41.91 17	34.2 0
	105	5	19	4	21	1	16	1
Apr. 10.2	25.65	64.9	24.87	46.4	38.60	21.2	41.75	34.3
20.2	24.67 98	63.8 11	24.69 18	45.7 7	38.41 19	20.9 3	41.61 14	34.4 1
30.2	23.80 87	62.3 15	24.54 15	44.7 10	38.26 15	20.3 6	41.49 12	34.5 1
May 10.1	23.09 71	60.4 19	24.42 12	43.4 13	38.15 11	19.6 7	41.41 8	34.7 2
20.1	22.56 53	58.1 23	24.33 9	41.7 17	38.08 7	18.8 8	41.36 5	34.8 1
	34	26	5	19	2	9	1	2
30.1	22.22	55.5	24.28	39.8	38.06	17.9	41.35	35.0
June 9.1	22.08 14	52.7 28	24.27 1	37.7 21	38.09 3	16.9 10	41.38 3	35.3 3
19.0	22.16 8	49.8 29	24.31 4	35.4 23	38.18 9	15.8 11	41.45 7	35.6 3
29.0	22.45 29	46.9 29	24.39 8	33.1 23	38.32 14	14.8 10	41.56 11	35.9 3
July 9.0	22.95 50	44.1 28	24.51 12	30.7 24	38.50 18	13.8 10	41.71 15	36.2 3
	69	28	15	24	22	9	18	4
18.9	23.64	41.3	24.66	28.3	38.72	12.9	41.89	36.6
28.9	24.51 87	38.7 26	24.84 18	26.0 23	38.98 26	12.0 9	42.10 21	36.9 3
Aug. 7.9	25.54 103	36.4 23	25.05 21	24.0 20	39.27 29	11.2 8	42.34 24	37.2 3
17.9	26.71 117	34.3 21	25.29 24	22.2 18	39.59 32	10.5 7	42.60 26	37.5 3
27.8	27.99 128	32.5 18	25.56 27	20.7 15	39.93 34	9.8 7	42.88 28	37.7 2
	138	14	28	11	36	6	29	0
Sept. 6.8	29.37	31.1	25.84	19.6	40.29	9.2	43.17	37.7
16.8	30.83 146	30.1 10	26.13 29	19.0 6	40.67 38	8.7 5	43.48 31	37.7 0
26.8	32.33 150	29.5 6	26.43 30	18.8 2	41.06 39	8.3 4	43.80 32	37.5 2
Oct. 6.7	33.85 152	29.3 2	26.74 31	19.1 3	41.45 39	8.0 3	44.12 32	37.2 3
16.7	35.37 152	29.6 3	27.05 31	19.9 8	41.85 40	7.8 2	44.44 32	36.7 5
	148	7	31	13	39	1	32	6
26.7	36.85	30.3	27.36	21.2	42.24	7.7	44.76	36.1
Nov. 5.6	38.26 141	31.4 11	27.65 29	22.9 17	42.62 38	7.8 1	45.07 31	35.4 7
15.6	39.57 131	33.0 16	27.92 27	25.0 21	42.98 36	8.0 2	45.36 29	34.7 7
25.6	40.76 119	35.0 20	28.17 25	27.4 24	43.32 34	8.4 4	45.64 28	34.0 7
Dec. 5.6	41.78 102	37.3 23	28.39 22	30.0 26	43.63 31	8.9 5	45.89 25	33.3 7
	83	26	18	27	26	7	22	7
15.5	42.61	39.9	28.57	32.7	43.89	9.6	46.11	32.6
25.5	43.21 60	42.7 28	28.71 14	35.4 27	44.10 21	10.4 8	46.28 17	32.0 6
35.5	43.58 37	45.7 30	28.80 9	38.1 27	44.26 16	11.3 9	46.41 13	31.5 5
Sec δ, Tan δ	5.572	+5.482	1.086	-0.422	1.295	+0.823	1.043	+0.296
Mean Place	24 ^s .375	39'' .53	24 ^s .623	41'' .01	37 ^s .896	6'' .67	41 ^s .195	27'' .70
D ⁺ α, D ₊ α	+0.14	+0.05	-0.01	0.00	+0.02	+0.01	+0.01	0.00
D ⁺ δ, D ₊ δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Argus. Mag. 3.2		♉ Monocerotis. Mag. 4.7		♊ Geminorum. Mag. 3.2		♋ Geminorum. Mag. 3.4	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 6 35	° ' -43 6	h m 6 36	° ' + 9 58	h m 6 38	° ' +25 13	h m 6 40	° ' +12 59
	s	"	s	"	s	"	s	"
Jan. 0.5	7.75	61.9	12.51	44.3	36.24	12.7	25.72	31.9
10.5	7.78 3	65.2 33	12.61 10	43.5 8	36.35 11	12.8 1	25.83 11	31.3 6
20.4	7.75 3	68.3 31	12.66 5	42.8 7	36.41 6	13.0 2	25.88 5	30.8 5
30.4	7.66 9	71.1 28	12.66 0	42.3 5	36.42 1	13.3 3	25.89 1	30.4 4
Feb. 9.4	7.51 15	73.6 25	12.61 5	41.9 4	36.37 5	13.7 4	25.85 4	30.1 3
	19	20	9	3	9	3	9	1
19.4	7.32	75.6	12.52	41.6	36.28	14.0	25.76	30.0
Mar. 1.3	7.09 23	77.2 16	12.40 12	41.4 2	36.15 13	14.4 4	25.64 12	29.9 1
11.3	6.83 26	78.3 11	12.25 15	41.3 1	35.99 16	14.7 3	25.49 15	29.9 0
21.3	6.55 28	79.0 7	12.09 16	41.3 0	35.82 17	14.9 2	25.33 16	29.9 0
31.3	6.27 28	79.1 1	11.92 17	41.4 1	35.64 18	15.0 1	25.17 16	30.0 1
	27	3	16	1	17	1	16	1
Apr. 10.2	6.00	78.8	11.76	41.5	35.47	15.1	25.01	30.1
20.2	5.74 26	78.0 8	11.62 14	41.7 2	35.32 15	15.0 1	24.86 15	30.3 2
30.2	5.51 23	76.7 13	11.50 12	42.0 3	35.19 13	14.9 1	24.74 12	30.5 2
May 10.1	5.32 19	75.0 17	11.41 9	42.4 4	35.10 9	14.7 2	24.65 9	30.7 2
20.1	5.16 16	73.0 20	11.36 5	42.8 4	35.04 6	14.5 2	24.60 5	31.0 3
	11	24	1	5	2	2	2	4
30.1	5.05	70.6	11.35	43.3	35.02	14.3	24.58	31.4
June 9.1	4.99 6	67.9 27	11.38 3	43.9 6	35.05 3	14.1 2	24.60 2	31.8 4
19.0	4.98 1	65.0 29	11.44 6	44.5 6	35.13 8	13.9 2	24.66 6	32.3 5
29.0	5.02 4	62.0 30	11.54 10	45.2 7	35.24 11	13.7 2	24.76 10	32.8 5
July 9.0	5.11 9	59.0 30	11.68 14	45.9 7	35.39 15	13.5 2	24.90 14	33.3 5
	14	30	17	7	19	2	17	5
19.0	5.25 18	56.0 29	11.85 20	46.6 7	35.58 22	13.3 2	25.07 20	33.8 5
28.9	5.43 23	53.1 27	12.05 23	47.3 7	35.80 25	13.1 1	25.27 23	34.3 4
Aug. 7.9	5.66 26	50.4 23	12.28 25	48.0 5	36.05 27	13.0 2	25.50 25	34.7 4
17.9	5.92 29	48.1 19	12.53 27	48.5 4	36.32 29	12.8 2	25.75 27	35.1 3
27.8	6.21 32	46.2 15	12.80 28	48.9 2	36.61 31	12.6 2	26.02 28	35.4 1
Sept. 6.8	6.53	44.7	13.08	49.1	36.92	12.4	26.30	35.5
16.8	6.87 34	43.8 9	13.38 30	49.2 1	37.25 33	12.1 3	26.60 30	35.4 1
26.8	7.22 35	43.4 4	13.68 30	49.0 2	37.58 33	11.8 3	26.91 31	35.2 2
Oct. 6.7	7.58 36	43.6 2	13.99 31	48.6 4	37.92 34	11.4 4	27.22 31	34.8 4
16.7	7.94 36	44.5 9	14.30 31	48.1 5	38.26 34	11.0 4	27.54 32	34.3 5
	35	15	31	7	34	5	31	7
26.7	8.29	46.0	14.61	47.4	38.60	10.5	27.85	33.6
Nov. 5.7	8.63 34	48.0 20	14.91 30	46.5 9	38.93 33	10.1 4	28.16 31	32.8 8
15.6	8.94 31	50.5 25	15.20 29	45.5 10	39.25 32	9.7 4	28.46 30	31.9 9
25.6	9.21 27	53.3 28	15.47 27	44.4 11	39.55 30	9.4 3	28.73 27	31.0 9
Dec. 5.6	9.44 23	56.5 32	15.72 25	43.3 11	39.82 27	9.1 3	28.98 25	30.0 10
	18	34	21	10	23	2	22	9
15.5	9.62 13	59.9 34	15.93 17	42.3 10	40.05 19	8.9 1	29.20 18	29.1 9
25.5	9.75 7	63.3 34	16.10 13	41.3 9	40.24 15	8.8 0	29.38 14	28.2 7
35.5	9.82	66.7 34	16.23	40.4	40.39		29.52	27.5
Sec δ, Tan δ	1.370	-0.936	1.015	+0.176	1.105	+0.471	1.026	+0.231
Mean Place	6 ^h .036	69 ^m .24	11 ^h .226	37 ^m .19	34 ^h .818	5 ^m .50	24 ^h .423	24 ^m .91
D'ψ α, Dω α	-0.02	-0.01	0.00	0.00	+0.01	+0.01	+0.01	0.00
Dψ δ, Dω δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ^5 Aurigæ. Mag. 5.3		α Canis Majoris. Mag. -1.6		18 Monocerotis. Mag. 4.7		43 Camelop. Mag. 5.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 6 40	° ' +43 39	h m 6 41	° ' -16 35	h m 6 43	° ' + 2 30	h m 6 44	° ' +68 59
	s	"	s	"	s	"	s	"
Jan. 0.5	30.13	61.5	19.93	39.7	20.71	36.4	23.75	35.0
10.5	30.26 13	62.7 12	20.00 7	42.0 23	20.81 10	35.1 13	23.94 19	37.6 26
20.4	30.33 7	64.0 13	20.02 2	44.2 22	20.86 5	34.0 11	24.01 7	40.2 26
30.4	30.33 0	65.4 14	20.00 2	46.1 19	20.86 0	33.0 10	23.95 6	42.7 25
Feb. 9.4	30.26 7	66.7 13	19.93 7	47.8 17	20.81 5	32.2 8	23.76 19	45.0 23
	12	11	11	14	9	6	29	20
19.4	30.14	67.8	19.82	49.2	20.72	31.6	23.47	47.0
Mar. 1.3	29.98 16	68.7 9	19.67 15	50.2 10	20.60 12	31.2 4	23.09 38	48.7 17
11.3	29.78 20	69.4 7	19.50 17	50.9 7	20.46 14	30.9 3	22.64 45	50.0 13
21.3	29.56 22	69.9 5	19.32 18	51.3 4	20.30 16	30.8 1	22.15 49	50.7 7
31.3	29.33 23	70.1 2	19.13 19	51.4 1	20.14 16	30.8 0	21.64 51	50.9 2
	22	1	18	3	16	2	50	2
Apr. 10.2	29.11	70.0	18.95	51.1	19.98	31.0	21.14	50.7
20.2	28.91 20	69.7 3	18.79 16	50.5 6	19.83 15	31.3 3	20.67 47	50.0 7
30.2	28.74 17	69.1 6	18.65 14	49.7 8	19.71 12	31.8 5	20.26 41	48.9 11
May 10.1	28.61 13	68.3 8	18.54 11	48.6 11	19.62 9	32.4 6	19.92 34	47.3 16
20.1	28.52 9	67.4 9	18.46 8	47.2 14	19.56 6	33.1 7	19.67 25	45.4 19
	3	11	4	16	3	8	15	21
30.1	28.49	66.3	18.42	45.6	19.53	33.9	19.52	43.3
June 9.1	28.51 2	65.1 12	18.41 1	43.8 18	19.54 1	34.9 10	19.47 5	41.0 23
19.0	28.59 8	63.8 13	18.45 4	41.9 19	19.59 5	35.9 10	19.53 6	38.5 25
29.0	28.72 13	62.5 13	18.53 8	39.9 20	19.68 9	37.0 11	19.70 17	35.9 26
July 9.0	28.90 18	61.3 12	18.64 11	37.8 21	19.81 13	38.1 11	19.96 26	33.4 25
	22	12	15	20	16	11	36	24
19.0	29.12	60.1	18.79	35.8	19.97	39.2	20.32	31.0
28.9	29.38 26	58.9 12	18.97 18	33.8 20	20.16 19	40.2 10	20.77 45	28.7 23
Aug. 7.9	29.68 30	57.8 11	19.18 21	32.0 18	20.37 21	41.2 10	21.30 53	26.5 22
17.9	30.01 33	56.8 10	19.41 23	30.5 15	20.61 24	42.1 9	21.90 60	24.6 19
27.8	30.37 36	55.9 9	19.66 25	29.3 12	20.86 25	42.7 6	22.56 66	22.9 17
	38	7	27	9	27	4	71	14
Sept. 6.8	30.75	55.2	19.93	28.4	21.13	43.1	23.27	21.5
16.8	31.15 40	54.6 6	20.22 29	27.9 5	21.42 29	43.3 2	24.01 74	20.4 11
26.8	31.56 41	54.0 6	20.52 30	27.9 0	21.72 30	43.2 1	24.78 77	19.6 8
Oct. 6.7	31.98 42	53.6 4	20.82 30	28.3 4	22.02 30	42.8 4	25.57 79	19.2 4
16.7	32.40 42	53.4 2	21.13 31	29.1 8	22.32 30	42.2 6	26.37 80	19.2 0
	41	0	30	12	30	9	79	4
26.7	32.81	53.4	21.43	30.3	22.62	41.3	27.16	19.6
Nov. 5.7	33.22 41	53.5 1	21.72 29	31.9 16	22.92 30	40.2 11	27.92 76	20.3 7
15.6	33.61 39	53.8 3	21.99 27	33.9 20	23.21 29	38.9 13	28.64 72	21.4 11
25.6	33.98 37	54.3 5	22.24 25	36.2 23	23.48 27	37.5 14	29.30 66	22.9 15
Dec. 5.6	34.31 33	55.0 7	22.46 22	38.6 24	23.72 24	36.0 15	29.89 59	24.7 18
	28	9	19	25	21	15	50	21
15.5	34.59	55.9	22.65	41.1	23.93	34.5	30.39	26.8
25.5	34.82 23	56.9 10	22.80 15	43.6 25	24.10 17	33.0 15	30.78 39	29.1 23
35.5	35.00 18	58.1 12	22.90 10	46.0 24	24.23 13	31.6 14	31.05 27	31.6 25
Sec δ , Tan δ	1.382	+0.955	1.044	-0.298	1.001	+0.044	2.790	+2.604
Mean Place	28°.302	54''.20	18°.860	46''.16	19°.451	29''.37	19°.896	27''.66
$D^* \alpha$, $D_* \alpha$	+0.02	+0.01	-0.01	0.00	0.00	0.00	+0.07	+0.03
$D^* \delta$, $D_* \delta$	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Geminorum. Mag. 3.6		α Pictoris. Mag. 3.3		ζ Mensæ. Mag. 5.6		τ Argus. Mag. 2.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 6 47	° ' +34 4	h m 6 47	° ' -61 50	h m 6 47	° ' -80 42	h m 6 47	° ' -50 30
	s	"	s	"	s	"	s	"
Jan. 0.5	5.00	8.4	20.65	43.8	26.21	73.0	48.58	31.0
10.5	5.13 13	9.1 7	20.63 2	47.5 37	25.90 31	76.6 36	48.60 2	34.5 35
20.5	5.20 7	9.8 7	20.52 11	51.0 35	25.33 57	80.0 34	48.56 4	37.9 34
30.4	5.21 1	10.6 8	20.32 20	54.2 32	24.52 81	83.2 32	48.45 11	41.0 31
Feb. 9.4	5.17 4	11.4 8	20.04 28	57.0 28	23.50 102	86.0 28	48.28 17	43.7 27
	9	8	34	24	120	25	23	23
19.4	5.08	12.2	19.70	59.4	22.30	88.5	48.05	46.0
Mar. 1.3	4.94 14	12.9 7	19.30 40	61.4 20	20.96 134	90.5 20	47.78 27	47.8 18
11.3	4.77 17	13.4 5	18.86 44	62.9 15	19.51 145	92.0 15	47.47 31	49.2 14
21.3	4.58 19	13.8 4	18.39 47	63.8 9	17.99 152	93.0 10	47.15 32	50.1 9
31.3	4.39 19	14.0 2	17.91 48	64.2 4	16.44 155	93.5 5	46.82 33	50.5 4
	19	0	47	1	155	1	33	2
Apr. 10.2	4.20	14.0	17.44	64.1	14.89	93.4	46.49	50.3
20.2	4.03 17	13.9 1	16.98 46	63.5 6	13.39 150	92.9 5	46.17 32	49.6 7
30.2	3.88 15	13.6 3	16.55 43	62.3 12	11.97 142	91.9 10	45.88 29	48.5 11
May 10.2	3.77 11	13.2 4	16.17 38	60.7 16	10.66 131	90.4 15	45.63 25	46.9 16
20.1	3.70 7	12.6 6	15.85 32	58.6 21	9.49 117	88.4 20	45.43 20	44.9 20
	3	6	26	25	101	23	16	24
30.1	3.67	12.0	15.59	56.1	8.48	86.1	45.27	42.5
June 9.1	3.69 2	11.3 7	15.39 20	53.3 28	7.66 82	83.4 27	45.16 11	39.8 27
19.0	3.76 7	10.6 7	15.27 12	50.3 30	7.05 61	80.5 29	45.11 5	36.9 29
29.0	3.87 11	9.8 8	15.22 5	47.1 32	6.66 39	77.4 31	45.11 0	33.8 31
July 9.0	4.02 15	9.0 8	15.25 3	43.8 33	6.50 16	74.1 33	45.17 6	30.6 32
	19	7	11	33	7	32	12	31
19.0	4.21	8.3	15.36	40.5	6.57	70.9	45.29	27.5
28.9	4.44 23	7.6 7	15.54 18	37.3 32	6.87 30	67.8 31	45.46 17	24.5 30
Aug. 7.9	4.71 27	7.0 6	15.80 26	34.3 30	7.40 53	64.9 29	45.68 22	21.7 28
17.9	5.00 29	6.4 6	16.12 32	31.7 26	8.14 74	62.2 27	45.94 26	19.1 26
27.8	5.31 31	5.8 6	16.50 38	29.4 23	9.07 93	59.9 23	46.25 31	16.9 22
	33	6	42	18	108	18	34	17
Sept. 6.8	5.64	5.2	16.92	27.6	10.15	58.1	46.59	15.2
16.8	5.98 34	4.7 5	17.38 46	26.4 12	11.36 121	56.8 13	46.96 37	14.1 11
26.8	6.34 36	4.2 5	17.87 49	25.8 6	12.66 130	56.1 7	47.35 39	13.6 5
Oct. 6.7	6.71 37	3.7 5	18.38 51	25.8 0	14.00 134	56.1 0	47.75 40	13.7 1
16.7	7.09 38	3.3 4	18.89 51	26.5 7	15.34 134	56.7 6	48.15 40	14.4 7
	37	4	50	14	128	12	39	14
26.7	7.46	2.9	19.39	27.9	16.62	57.9	48.54	15.8
Nov. 5.7	7.82 36	2.7 2	19.86 47	29.8 19	17.80 118	59.8 19	48.92 38	17.8 20
15.6	8.17 35	2.6 1	20.28 42	32.3 25	18.83 103	62.2 24	49.27 35	20.3 25
25.6	8.50 33	2.6 0	20.65 37	35.3 30	19.67 84	65.0 28	49.58 31	23.2 29
Dec. 5.6	8.80 30	2.7 1	20.95 30	38.6 33	20.29 62	68.2 32	49.84 26	26.5 33
	26	3	22	36	38	35	20	35
15.5	9.06	3.0	21.17	42.2	20.67	71.7	50.04	30.0
25.5	9.28 22	3.4 4	21.30 13	45.9 37	20.79 12	75.3 36	50.18 14	33.6 36
35.5	9.45 17	4.0 6	21.34 4	49.7 38	20.64 15	79.0 37	50.25 7	37.2 36
Sec δ , Tan δ	1.207	+0.676	2.119	-1.868	6.202	-6.121	1.572	-1.213
Mean Place	3°.413	1''.61	18°.005	52''.42	18°.312	82''.11	46°.631	39''.28
D' ψ α , D ω α	+0.02	+0.01	-0.05	-0.03	-0.16	-0.08	-0.03	-0.02
D ψ δ , D ω δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α^2 Canis Majoris. Mag. 3.1		γ Canis Majoris. Mag. 4.1		δ Canis Majoris. Mag. 2.0		63 Aurigæ. Mag. 5.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 6 59 s	° ' -23 41 "	h m 6 59 s	° ' -15 29 "	h m 7 4 s	° ' -26 14 "	h m 7 5 s	° ' +39 27 "
Jan. 0.5	24.83	71.9	50.63	67.0	52.52	67.8	42.20	54.1
10.5	24.92 9	74.6 27	50.73 10	69.3 23	52.61 9	70.6 28	42.36 16	55.1 10
20.5	24.96 4	77.2 26	50.78 5	71.5 22	52.65 4	73.3 27	42.46 10	56.1 10
30.4	24.94 2	79.5 23	50.77 1	73.5 20	52.64 1	75.8 25	42.49 3	57.2 11
Feb. 9.4	24.87 7	81.5 20	50.72 5	75.2 17	52.58 6	78.0 22	42.46 3	58.3 11
	11 17		9 14		11 18		9 10	
19.4	24.76	83.2	50.63	76.6	52.47	79.8	42.37	59.3
Mar. 1.4	24.62 14	84.6 14	50.50 13	77.7 11	52.32 15	81.3 15	42.24 13	60.3 10
11.3	24.45 17	85.6 10	50.35 15	78.5 8	52.14 18	82.4 11	42.07 17	61.1 8
21.3	24.26 19	86.2 6	50.18 17	79.0 5	51.94 20	83.1 7	41.88 19	61.7 6
31.3	24.06 20	86.5 3	50.00 18	79.2 2	51.74 20	83.5 4	41.67 21	62.1 4
	19 1		18 2		20 1		21 2	
Apr. 10.2	23.87	86.4	49.82	79.0	51.54	83.4	41.46	62.3
20.2	23.69 18	85.9 5	49.65 17	78.5 5	51.35 19	82.9 5	41.27 19	62.2 1
30.2	23.53 16	85.0 9	49.50 15	77.8 7	51.18 17	82.1 8	41.10 17	61.9 3
May 10.2	23.39 14	83.8 12	49.38 12	76.8 10	51.04 14	81.0 11	40.96 14	61.4 5
20.1	23.28 11	82.4 14	49.29 9	75.6 12	50.92 12	79.5 15	40.87 9	60.7 7
	7 17		5 15		8 18		5 9	
30.1	23.21	80.7	49.24	74.1	50.84	77.7	40.82	59.8
June 9.1	23.18 3	78.7 20	49.22 2	72.4 17	50.80 4	75.7 20	40.82 0	58.9 9
19.1	23.19 1	76.5 22	49.24 2	70.6 18	50.80 0	73.5 22	40.87 5	57.9 10
29.0	23.24 5	74.2 23	49.30 6	68.7 19	50.84 4	71.1 24	40.96 9	56.8 11
July 9.0	23.33 9	71.9 23	49.40 10	66.7 20	50.92 8	68.7 24	41.10 14	55.7 11
	12 23		13 20		12 24		18 11	
19.0	23.45	69.6	49.53	64.7	51.04	66.3	41.28	54.6
28.9	23.61 16	67.4 22	49.69 16	62.8 19	51.19 15	63.9 24	41.50 22	53.5 11
Aug. 7.9	23.80 19	65.3 21	49.88 19	61.0 18	51.37 18	61.7 22	41.76 26	52.4 11
17.9	24.02 22	63.4 19	50.09 21	59.5 15	51.58 21	59.8 19	42.05 29	51.4 10
27.9	24.26 24	61.8 16	50.33 24	58.2 13	51.82 24	58.2 16	42.36 31	50.4 10
	26 12		26 10		27 13		34 9	
Sept. 6.8	24.52	60.6	50.59	57.2	52.09	56.9	42.70	49.5
16.8	24.80 28	59.8 8	50.87 28	56.6 6	52.38 29	56.0 9	43.06 36	48.7 8
26.8	25.10 30	59.5 3	51.16 29	56.5 1	52.68 30	55.6 4	43.44 38	47.9 8
Oct. 6.8	25.41 31	59.7 2	51.46 30	56.8 3	52.99 31	55.8 2	43.83 39	47.2 7
16.7	25.73 32	60.4 7	51.77 31	57.5 7	53.31 32	56.5 7	44.23 40	46.6 6
	31 12		31 11		32 12		40 4	
26.7	26.04	61.6	52.08	58.6	53.63	57.7	44.63	46.2
Nov. 5.7	26.35 31	63.3 17	52.38 30	60.1 15	53.94 31	59.3 16	45.03 40	45.9 3
15.6	26.64 29	65.3 20	52.67 29	62.0 19	54.24 30	61.4 21	45.41 38	45.8 1
25.6	26.91 27	67.7 24	52.94 27	64.1 21	54.52 28	63.8 24	45.77 36	45.8 0
Dec. 5.6	27.16 25	70.3 26	53.18 24	66.4 23	54.77 25	66.5 27	46.11 34	46.1 3
	21 28		21 24		21 29		30 5	
15.6	27.37	73.1	53.39	68.8	54.98	69.4	46.41	46.6
25.5	27.53 16	75.9 28	53.56 17	71.3 25	55.15 17	72.3 29	46.56 25	47.2 6
35.5	27.65 12	78.7 28	53.69 13	73.8 25	55.28 13	75.2 29	46.86 20	48.0 8
Sec δ , Tan δ	1.092	-0.439	1.038	-0.277	1.115	-0.493	1.295	+0.823
Mean Place	23 ^s .501	79 ^{''} .73	49 ^s .361	74 ^{''} .52	51 ^s .179	75 ^{''} .97	40 ^s .459	48 ^{''} .41
D ψ α , D ω α	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	+0.02	+0.02
D ψ δ , D ω δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♊ Geminorum. Mag. 5.3		γ ² Volantis. Mag. 3.9		25 H. Camelop. Mag. 5.1		λ Geminorum. Mag. 3.6	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 7 8	° ' +16 18	h m 7 9	° ' -70 21	h m 7 12	° ' +82 34	h m 7 13	° ' +16 41
	s	"	s	"	s	"	s	"
Jan. 0.5	23.96	32.9	32.84	17.5	62.33	60.5	7.01	59.2
10.5	24.10 ¹⁴	32.4 ⁵	32.82 ²	21.3 ³⁸	62.89 ⁵⁶	63.5 ³⁰	7.15 ¹⁴	58.7 ⁵
20.5	24.18 ⁸	32.0 ⁴	32.68 ¹⁴	25.0 ³⁷	63.10 ²¹	66.6 ³¹	7.24 ⁹	58.3 ⁴
30.4	24.21 ³	31.8 ²	32.41 ²⁷	28.4 ³⁴	62.97 ¹³	69.6 ³⁰	7.27 ³	58.1 ²
Feb. 9.4	24.19 ²	31.7 ¹	32.03 ³⁸	31.5 ³¹	62.50 ⁴⁷	72.4 ²⁸	7.26 ¹	58.0 ¹
	6	0	48	27	78	26	6	0
19.4	24.13	31.7	31.55	34.2	61.72	75.0	7.20	58.0
Mar. 1.4	24.03 ¹⁰	31.8 ¹	30.99 ⁵⁶	36.5 ²³	60.68 ¹⁰⁴	77.2 ²²	7.10 ¹⁰	58.1 ¹
	13	1	62	19	125	17	13	1
11.3	23.90 ¹³	31.9 ¹	30.37 ⁶⁷	38.4 ¹⁹	59.43 ¹²⁵	78.9 ¹⁷	6.97 ¹³	58.2 ¹
21.3	23.74 ¹⁶	32.0 ¹	29.70 ⁶⁷	39.7 ¹³	58.02 ¹⁴¹	80.1 ¹²	6.82 ¹⁵	58.4 ²
31.3	23.57 ¹⁷	32.2 ²	29.01 ⁶⁹	40.5 ⁸	56.52 ¹⁵⁰	80.7 ⁶	6.66 ¹⁶	58.6 ²
	16	2	69	3	151	1	17	2
Apr. 10.2	23.41	32.4	28.32	40.8	55.01	80.8	6.49	58.8
20.2	23.26 ¹⁵	32.6 ²	27.64 ⁶⁸	40.6 ²	53.54 ¹⁴⁷	80.3 ⁵	6.33 ¹⁶	59.0 ²
30.2	23.13 ¹³	32.8 ²	26.99 ⁶⁵	39.8 ⁸	52.18 ¹³⁶	79.2 ¹¹	6.20 ¹³	59.1 ¹
May 10.2	23.02 ¹¹	32.9 ¹	26.39 ⁶⁰	38.5 ¹³	50.98 ¹²⁰	77.6 ¹⁶	6.09 ¹¹	59.3 ²
20.1	22.95 ⁷	33.1 ²	25.85 ⁵⁴	36.7 ¹⁸	49.98 ¹⁰⁰	75.6 ²⁰	6.02 ⁷	59.5 ²
	4	2	46	22	77	24	4	2
30.1	22.91	33.3	25.39	34.5	49.21	73.2	5.98	59.7
June 9.1	22.91 ⁰	33.5 ²	25.02 ³⁷	32.0 ²⁵	48.71 ⁵⁰	70.5 ²⁷	5.97 ¹	59.9 ²
19.1	22.95 ⁴	33.7 ²	24.74 ²⁸	29.2 ²⁸	48.49 ²²	67.6 ²⁹	6.01 ⁴	60.1 ²
29.0	23.03 ⁸	34.0 ³	24.57 ¹⁷	26.1 ³¹	48.55 ⁶	64.6 ³⁰	6.09 ⁸	60.3 ²
July 9.0	23.15 ¹²	34.2 ²	24.50 ⁷	22.9 ³²	48.90 ³⁵	61.5 ³¹	6.20 ¹¹	60.5 ²
	15	2	4	33	63	30	15	2
19.0	23.30	34.4	24.54	19.6	49.53	58.5	6.35	60.7
28.9	23.48 ¹⁸	34.6 ²	24.69 ¹⁵	16.4 ³²	50.42 ⁸⁹	55.5 ³⁰	6.52 ¹⁷	60.8 ¹
Aug. 7.9	23.69 ²¹	34.8 ²	24.94 ²⁵	13.3 ³¹	51.55 ¹¹³	52.7 ²⁸	6.72 ²⁰	60.9 ¹
	23	1	35	29	136	26	23	1
17.9	23.92 ²³	34.9 ¹	25.29 ³⁵	10.4 ²⁹	52.91 ¹³⁶	50.1 ²⁶	6.95 ²³	61.0 ¹
27.9	24.17 ²⁵	34.9 ⁰	25.74 ⁴⁵	7.9 ²⁵	54.47 ¹⁵⁶	47.7 ²⁴	7.20 ²⁵	60.9 ¹
	27	2	53	20	173	20	27	2
Sept. 6.8	24.44	34.7	26.27	5.9	56.20	45.7	7.47	60.7
16.8	24.73 ²⁹	34.4 ³	26.86 ⁵⁹	4.4 ¹⁵	58.07 ¹⁸⁷	44.1 ¹⁶	7.76 ²⁹	60.4 ³
26.8	25.04 ³¹	34.0 ⁴	27.50 ⁶⁴	3.5 ⁹	60.04 ¹⁹⁷	42.8 ¹³	8.07 ³¹	60.0 ⁴
Oct. 6.8	25.36 ³²	33.5 ⁵	28.18 ⁶⁸	3.2 ³	62.09 ²⁰⁵	41.9 ⁹	8.38 ³¹	59.4 ⁶
16.7	25.68 ³²	32.8 ⁷	28.87 ⁶⁹	3.6 ⁴	64.18 ²⁰⁹	41.5 ⁴	8.70 ³²	58.7 ⁷
	33	8	68	11	208	1	33	8
26.7	26.01	32.0	29.55	4.7	66.26	41.6	9.03	57.9
Nov. 5.7	26.33 ³²	31.1 ⁹	30.20 ⁶⁵	6.4 ¹⁷	68.29 ²⁰³	42.2 ⁶	9.36 ³³	57.0 ⁹
15.6	26.65 ³²	30.1 ¹⁰	30.79 ⁵⁹	8.7 ²³	70.23 ¹⁹⁴	43.2 ¹⁰	9.68 ³²	56.0 ¹⁰
25.6	26.95 ³⁰	29.2 ⁹	31.31 ⁵²	11.5 ²⁸	72.02 ¹⁷⁹	44.7 ¹⁵	9.99 ³¹	55.0 ¹⁰
Dec. 5.6	27.23 ²⁸	28.3 ⁹	31.73 ⁴²	14.7 ³²	73.62 ¹⁶⁰	46.7 ²⁰	10.27 ²⁸	54.1 ⁹
	24	9	31	35	136	23	25	8
15.6	27.47	27.4	32.04	18.2	74.98	49.0	10.52	53.3
25.5	27.68 ²¹	26.7 ⁷	32.23 ¹⁹	21.9 ³⁷	76.06 ¹⁰⁸	51.6 ²⁶	10.73 ²¹	52.5 ⁸
35.5	27.85 ¹⁷	26.0 ⁷	32.30 ⁷	25.7 ³⁸	76.83 ⁷⁷	54.5 ²⁹	10.90 ¹⁷	51.8 ⁷
Sec δ, Tan δ	1.042	+0.293	2.974	-2.801	7.747	+7.682	1.044	+0.300
Mean Place	22 ^h .625	26 ^m '''.75	29 ^h .285	28 ^m '''.07	50 ^h .993	55 ^m '''.51	5 ^h .670	53 ^m '''.17
D' δ α, D _∞ α	+0.01	+0.01	-0.07	-0.06	+0.19	+0.16	+0.01	+0.01
D _p δ, D _∞ δ	-0.1	+1.0	-0.1	+1.0	-0.1	+1.0	-0.1	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Argus. Mag. 2.7		δ Geminorum. Mag. 3.5		δ Volantis. Mag. 4.0		ι Geminorum. Mag. 3.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 7 14	° ' -36 56	h m 7 14	° ' +22 8	h m 7 16	° ' -67 47	h m 7 20	° ' +27 5
Jan. 0.5	5.68	18.3	57.14	41.9	56.13	42.0	21.00	23.9
10.5	5.77 9	21.6 33	57.29 15	41.8 1	56.15 2	45.7 37	21.16 16	24.1 1
20.5	5.80 3	24.7 31	57.38 9	41.7 1	56.06 9	49.4 37	21.27 11	24.4 3
30.4	5.77 3	27.6 29	57.42 4	41.8 1	55.85 21	52.9 35	21.32 5	24.9 5
Feb. 9.4	5.69 8	30.2 26	57.41 1	42.0 2	55.54 31	56.1 32	21.31 1	25.4 5
	13	23	6	3	40	28	6	5
19.4	5.56	32.5	57.35	42.3	55.14	58.9	21.25	25.9
Mar. 1.4	5.39 17	34.4 19	57.25 10	42.6 3	54.67 47	61.3 24	21.15 10	26.5 6
11.3	5.18 21	35.8 14	57.12 13	42.9 3	54.14 53	63.3 20	21.01 14	27.0 5
21.3	4.95 23	36.8 10	56.96 16	43.2 3	53.56 58	64.7 14	20.85 16	27.5 5
31.3	4.71 24	37.4 6	56.79 17	43.5 3	52.96 60	65.6 9	20.68 17	27.9 4
	24	1	16	2	61	4	18	2
Apr. 10.3	4.47	37.5	56.63	43.7	52.35	66.0	20.50	28.1
20.2	4.24 23	37.1 4	56.47 16	43.8 1	51.75 60	65.9 1	20.33 17	28.2 1
30.2	4.03 21	36.3 8	56.33 14	43.9 1	51.18 57	65.2 7	20.18 15	28.2 0
May 10.2	3.85 18	35.1 12	56.22 11	44.0 1	50.65 53	64.0 12	20.06 12	28.1 1
20.1	3.70 15	33.5 16	56.14 8	44.0 0	50.18 47	62.3 17	19.97 9	27.9 2
	12	19	5	1	40	21	5	3
30.1	3.58	31.6	56.09	43.9	49.78	60.2	19.92	27.6
June 9.1	3.50 8	29.4 22	56.09 0	43.8 1	49.45 33	57.7 25	19.91 1	27.2 4
19.1	3.47 3	26.9 25	56.13 4	43.7 1	49.20 25	54.9 28	19.95 4	26.8 4
29.0	3.48 1	24.2 27	56.20 7	43.6 1	49.04 16	51.9 30	20.02 7	26.4 4
July 9.0	3.53 5	21.4 28	56.31 11	43.5 1	48.98 6	48.7 32	20.13 11	25.9 5
	10	27	15	1	4	33	15	5
19.0	3.63	18.7	56.46	43.4	49.02	45.4	20.28	25.4
29.0	3.77 14	16.0 27	56.64 18	43.2 2	49.15 13	42.2 32	20.46 18	24.9 5
Aug. 7.9	3.95 18	13.4 26	56.85 21	43.0 2	49.37 22	39.1 31	20.68 22	24.3 6
17.9	4.16 21	11.1 23	57.09 24	42.7 3	49.68 31	36.2 29	20.92 24	23.7 6
27.9	4.40 24	9.1 20	57.35 26	42.4 3	50.07 39	33.7 25	21.19 27	23.1 6
	27	16	28	4	46	21	29	6
Sept. 6.8	4.67	7.5	57.63	42.0	50.53	31.6	21.48	22.5
16.8	4.97 30	6.4 11	57.93 30	41.5 5	51.06 53	30.0 16	21.79 31	21.8 7
26.8	5.29 32	5.8 6	58.24 31	41.0 5	51.64 58	29.0 10	22.12 33	21.1 7
Oct. 6.8	5.63 34	5.8 0	58.57 33	40.4 6	52.25 61	28.7 3	22.46 34	20.3 8
16.7	5.97 34	6.4 6	58.90 33	39.7 7	52.87 62	29.0 3	22.81 35	19.5 8
	34	11	34	8	62	10	35	7
26.7	6.31	7.5	59.24	38.9	53.49	30.0	23.16	18.8
Nov. 5.7	6.65 34	9.2 17	59.58 34	38.1 8	54.08 59	31.7 17	23.51 35	18.1 7
15.7	6.98 33	11.4 22	59.91 33	37.3 8	54.63 55	33.9 22	23.86 35	17.5 6
25.6	7.28 30	14.0 26	60.23 32	36.5 8	55.12 49	36.6 27	24.20 34	16.9 6
Dec. 5.6	7.55 27	16.9 29	60.52 29	35.8 7	55.52 40	39.8 32	24.51 31	16.5 4
	22	32	26	6	31	35	28	3
15.6	7.77	20.1	60.78	35.2	55.83	43.3	24.79	16.2
25.5	7.95 18	23.4 33	61.00 22	34.8 4	56.04 21	47.0 37	25.03 24	16.1 1
35.5	8.08 13	26.8 34	61.19 19	34.5 3	56.14 10	50.8 38	25.22 19	16.1 0
Sec δ , Tan δ	1.251	-0.752	1.080	+0.407	2.646	-2.450	1.132	+0.531
Mean Place	4 ^h .205	27'''.42	55 ^h .739	36'''.20	53 ^h .036	52'''.92	19 ^h .517	18'''.72
D' ψ α , D ω α	-0.02	-0.02	+0.01	+0.01	-0.06	-0.05	+0.01	+0.01
D' ψ δ , D ω δ	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9	-0.1	+0.9

FOR THE UPPER TRANSIT AT ~~WATGERS~~

1913

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ Argus. Mag. 3.3		α^2 Geminorum. Mag. 2.0		δ Monocerotis. Mag. 5.2		α Canis Minoris. Mag. 0.5	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 7 26 s	° ' -43 7 "	h m 7 29 s	° ' +32 4 "	h m 7 32 s	° ' - 3 54 "	h m 7 34 s	° ' + 5 26 "
Jan. 0.5	29.75	19.2	4.64	54.3	58.34	50.4	46.10	60.2
10.5	29.85 ¹⁰	22.7 ³⁵	4.81 ¹⁷	54.7 ⁴	58.48 ¹⁴	52.2 ¹⁸	46.24 ¹⁴	58.9 ¹³
20.5	29.88 ³	26.0 ³³	4.93 ¹²	55.3 ⁶	58.57 ⁹	53.9 ¹⁷	46.34 ¹⁰	57.8 ¹¹
30.5	29.85 ³	29.1 ³¹	4.99 ⁶	56.0 ⁷	58.61 ⁴	55.4 ¹⁵	46.39 ⁵	56.9 ⁹
Feb. 9.4	29.76 ⁹	32.0 ²⁹	4.99 ⁰	56.7 ⁷	58.60 ¹	56.7 ¹³	46.39 ⁰	56.1 ⁸
	¹⁴	²⁶	⁵	⁸	⁵	¹⁰	⁵	⁶
19.4	29.62	34.6	4.94	57.5	58.55	57.7	46.34	55.5
Mar. 1.4	29.43 ¹⁹	36.8 ²²	4.84 ¹⁰	58.3 ⁸	58.46 ⁹	58.5 ⁸	46.25 ⁹	55.1 ⁴
	²²	¹⁷	¹⁴	⁷	¹²	⁶	¹²	²
11.3	29.21 ²⁵	38.5 ¹²	4.70 ¹⁷	59.0 ⁶	58.34 ¹⁴	59.1 ³	46.13 ¹⁴	54.9 ¹
21.3	28.96 ²⁷	39.7 ⁷	4.53 ¹⁸	59.6 ⁵	58.20 ¹⁶	59.4 ¹	45.99 ¹⁶	54.8 ⁰
31.3	28.69 ²⁷	40.4 ³	4.35 ¹⁸	60.1 ³	58.04 ¹⁶	59.5 ¹	45.83 ¹⁶	54.8 ¹
Apr. 10.3	28.42	40.7	4.17	60.4	57.88	59.4	45.67	54.9
20.2	28.16 ²⁶	40.5 ²	3.99 ¹⁸	60.5 ¹	57.72 ¹⁶	59.2 ²	45.52 ¹⁵	55.1 ²
30.2	27.92 ²⁴	39.8 ⁷	3.83 ¹⁶	60.5 ⁰	57.58 ¹⁴	58.8 ⁴	45.38 ¹⁴	55.5 ⁴
May 10.2	27.70 ²²	38.7 ¹¹	3.70 ¹³	60.3 ²	57.46 ¹²	58.2 ⁶	45.27 ¹¹	56.0 ⁵
20.2	27.51 ¹⁹	37.2 ¹⁵	3.60 ¹⁰	60.0 ³	57.37 ⁹	57.4 ⁸	45.18 ⁹	56.5 ⁵
	¹⁵	¹⁹	⁶	⁴	⁶	¹⁰	⁶	⁶
30.1	27.36	35.3	3.54	59.6	57.31	56.4	45.12	57.1
June 9.1	27.25 ¹¹	33.0 ²³	3.52 ²	59.0 ⁶	57.28 ³	55.3 ¹¹	45.10 ²	57.7 ⁶
19.1	27.18 ⁷	30.5 ²⁵	3.54 ²	58.3 ⁷	57.29 ¹	54.1 ¹²	45.12 ²	58.4 ⁷
29.0	27.16 ²	27.8 ²⁷	3.60 ⁶	57.6 ⁷	57.33 ⁴	52.9 ¹²	45.17 ⁵	59.2 ⁸
July 9.0	27.19 ³	24.9 ²⁹	3.71 ¹¹	56.9 ⁷	57.40 ⁷	51.6 ¹³	45.25 ⁸	60.0 ⁸
	⁷	²⁹	¹⁵	⁸	¹¹	¹³	¹¹	⁷
19.0	27.26	22.0	3.86	56.1	57.51	50.3	45.36	60.7
29.0	27.38 ¹²	19.1 ²⁹	4.04 ¹⁸	55.3 ⁸	57.65 ¹⁴	49.0 ¹³	45.51 ¹⁵	61.4 ⁷
Aug. 7.9	27.54 ¹⁶	16.3 ²⁸	4.25 ²¹	54.5 ⁸	57.82 ¹⁷	47.9 ¹¹	45.69 ¹⁸	62.0 ⁶
	²¹	²⁵	²⁴	⁸	¹⁹	¹⁰	²⁰	⁵
17.9	27.75 ²⁵	13.8 ²²	4.49 ²⁷	53.7 ⁹	58.01 ²²	46.9 ⁸	45.89 ²²	62.5 ³
27.9	28.00 ²⁸	11.6 ¹⁸	4.76 ³⁰	52.8 ⁸	58.23 ²⁴	46.1 ⁶	46.11 ²⁴	62.8 ¹
Sept. 6.9	28.28	9.8	5.06	52.0	58.47	45.5	46.35	62.9
16.8	28.59 ³¹	8.5 ¹³	5.38 ³²	51.1 ⁹	58.73 ²⁶	45.2 ³	46.61 ²⁶	62.8 ¹
26.8	28.92 ³³	7.7 ⁸	5.71 ³³	50.2 ⁹	59.01 ²⁸	45.3 ¹	46.89 ²⁸	62.5 ³
Oct. 6.8	29.27 ³⁵	7.5 ²	6.06 ³⁵	49.3 ⁹	59.30 ²⁹	45.7 ⁴	47.19 ³⁰	61.9 ⁶
16.7	29.64 ³⁷	7.9 ⁴	6.42 ³⁶	48.5 ⁸	59.60 ³⁰	46.4 ⁷	47.50 ³¹	61.1 ⁸
	³⁷	¹¹	³⁷	⁸	³¹	¹⁰	³¹	¹¹
26.7	30.01	9.0	6.79	47.7	59.91	47.4	47.81	60.0
Nov. 5.7	30.37 ³⁶	10.6 ¹⁶	7.16 ³⁷	47.0 ⁷	60.22 ³¹	48.8 ¹⁴	48.12 ³¹	58.8 ¹²
15.7	30.72 ³⁵	12.7 ²¹	7.52 ³⁶	46.4 ⁶	60.53 ³¹	50.4 ¹⁶	48.43 ³¹	57.4 ¹⁴
25.6	31.05 ³³	15.3 ²⁶	7.87 ³⁵	45.9 ⁵	60.82 ²⁹	52.2 ¹⁸	48.73 ³⁰	55.9 ¹⁵
Dec. 5.6	31.34 ²⁹	18.3 ³⁰	8.20 ³³	45.6 ³	61.09 ²⁷	54.1 ¹⁹	49.01 ²⁸	54.3 ¹⁶
	²⁴	³³	³⁰	¹	²⁵	²⁰	²⁵	¹⁶
15.6	31.58	21.6	8.50	45.5	61.34	56.1	49.26	52.7
25.6	31.78 ²⁰	25.1 ³⁵	8.76 ²⁶	45.6 ¹	61.55 ²¹	58.1 ²⁰	49.48 ²²	51.2 ¹⁵
35.5	31.92 ¹⁴	28.6 ³⁵	8.97 ²¹	45.8 ²	61.72 ¹⁷	60.0 ¹⁹	49.65 ¹⁷	49.8 ¹⁴
Sec δ , Tan δ	1.370	-0.937	1.180	+0.627	1.002	-0.068	1.005	+0.095
Mean Place	28°.193	29''.25	3°.069	49''.81	57°.136	57''.37	44°.907	54''.76
D' ψ α , D ω α	-0.02	-0.02	+0.02	+0.02	0.00	0.00	0.00	0.00
D ψ δ , D ω δ	-0.1	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♋ Lynx. Mag. 5.0		κ Geminorum. Mag. 3.7		β Geminorum. Mag. 1.2		4 Puppis. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m s	° ' "	h m s	° ' "	h m s	° ' "	h m s	° ' "
	7 35	+58 54	7 39	+24 36	7 39	+28 14	7 41	-14 20
Jan. 0.5	41.96	57.2	13.30	31.1	61.15	17.9	57.70	58.0
10.5	42.21 25	59.1 19	13.47 17	31.0 1	61.33 18	18.0 1	57.84 14	60.4 24
20.5	42.38 17	61.2 21	13.59 12	31.0 0	61.46 13	18.3 3	57.93 9	62.7 23
30.5	42.46 8	63.3 21	13.66 7	31.2 2	61.53 7	18.7 4	57.97 4	64.8 21
Feb. 9.4	42.44 2	65.4 21	13.67 1	31.6 4	61.54 1	19.3 6	57.96 1	66.6 18
	11	20	4	4	4	6	5	16
19.4	42.33	67.4	13.63	32.0	61.50	19.9	57.91	68.2
Mar. 1.4	42.15 18	69.2 18	13.55 8	32.5 5	61.41 9	20.6 7	57.81 10	69.5 13
11.4	41.90 25	70.8 16	13.43 12	33.0 5	61.28 13	21.2 6	57.68 13	70.5 10
21.3	41.61 29	72.0 12	13.28 15	33.4 4	61.13 15	21.7 5	57.53 15	71.2 7
31.3	41.29 32	72.8 8	13.12 16	33.8 4	60.96 17	22.2 5	57.37 16	71.6 4
	33	4	17	3	17	4	17	1
Apr. 10.3	40.96	73.2	12.95	34.1	60.79	22.6	57.20	71.7
20.2	40.64 32	73.2 0	12.78 17	34.4 3	60.62 17	22.8 2	57.03 17	71.5 2
30.2	40.34 30	72.8 4	12.63 15	34.5 1	60.46 16	22.9 1	56.87 16	71.0 5
May 10.2	40.08 26	72.0 8	12.51 12	34.6 1	60.33 13	22.9 0	56.74 13	70.2 8
20.2	39.87 21	70.9 11	12.42 9	34.5 1	60.23 10	22.7 2	56.63 11	69.2 10
	15	15	6	1	6	3	8	12
30.1	39.72	69.4	12.36	34.4	60.17	22.4	56.55	68.0
June 9.1	39.63 9	67.7 17	12.34 2	34.2 2	60.14 3	22.1 3	56.51 4	66.6 14
19.1	39.61 2	65.8 19	12.35 1	34.0 2	60.15 1	21.7 4	56.50 1	65.0 16
29.0	39.66 5	63.7 21	12.40 5	33.7 3	60.20 5	21.2 5	56.52 2	63.3 17
July 9.0	39.78 12	61.5 22	12.49 9	33.4 3	60.29 9	20.6 6	56.58 6	61.5 18
	18	23	13	4	13	6	9	18
19.0	39.96	59.2	12.62	33.0	60.42	20.0	56.67	59.7
29.0	40.21 25	57.0 22	12.78 16	32.6 4	60.58 16	19.4 6	56.79 12	58.0 17
Aug. 7.9	40.52 31	54.8 22	12.97 19	32.1 5	60.77 19	18.8 6	56.94 15	56.3 17
17.9	40.88 36	52.7 21	13.19 22	31.6 5	60.99 22	18.1 7	57.12 18	54.8 15
27.9	41.28 40	50.7 20	13.43 24	31.0 6	61.24 25	17.3 8	57.33 21	53.6 12
	45	18	27	6	28	8	23	10
Sept. 6.9	41.73	48.9	13.70	30.4	61.52	16.5	57.56	52.6
16.8	42.22 49	47.2 17	13.99 29	29.7 7	61.82 30	15.7 8	57.82 26	52.0 6
26.8	42.74 52	45.8 14	14.30 31	28.9 8	62.14 32	14.8 9	58.10 28	51.8 2
Oct. 6.8	43.28 54	44.6 12	14.62 32	28.0 9	62.47 33	13.8 10	58.39 29	52.0 2
16.7	43.84 56	43.7 9	14.96 34	27.1 9	62.82 35	12.9 9	58.69 30	52.6 6
	57	6	34	9	35	9	31	11
26.7	44.41	43.1	15.30	26.2	63.17	12.0	59.00	53.7
Nov. 5.7	44.98 57	42.9 2	15.65 35	25.2 10	63.53 36	11.1 9	59.31 31	55.1 14
15.7	45.54 56	43.0 1	16.00 35	24.3 9	63.89 36	10.3 8	59.62 31	56.9 18
25.6	46.08 54	43.5 5	16.33 33	23.5 8	64.23 34	9.6 7	59.92 30	59.0 21
Dec. 5.6	46.58 50	44.3 8	16.65 32	22.7 8	64.55 32	9.0 6	60.20 28	61.3 23
	45	11	29	6	30	4	25	24
15.6	47.03	45.4	16.94	22.1	64.85	8.6	60.45	63.7
25.6	47.42 39	46.9 15	17.19 25	21.7 4	65.11 26	8.4 2	60.66 21	66.2 25
35.5	47.73 31	48.7 18	17.40 21	21.5 2	65.32 21	8.4 0	60.83 17	68.7 25
Sec δ, Tan δ	1.937	+1.659	1.100	+0.458	1.135	+0.537	1.032	-0.256
Mean Place	39°.203	54''.27	11°.869	26''.61	59°.666	13''.77	56°.508	66''.05
D'φ α, Dα α	+0.04	+0.04	+0.01	+0.01	+0.01	+0.02	-0.01	-0.01
D'δ, Dα δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Argus. Mag. 3.5		φ Geminorum. Mag. 5.0		28 Lynceis. Mag. 5.7		Groombridge 1874. Mag. 5.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 7 45 s	° ' -24 38 "	h m 7 48 s	° ' +26 59 "	h m 7 48 s	° ' +47 47 "	h m 7 49 s	° ' +74 8 "
Jan. 0.5	39.35	17.7	11.99	34.6	25.07	30.4	53.72	68.1
10.5	39.49 14	20.6 29	12.18 19	34.6 0	25.30 23	31.6 12	54.17 45	70.6 25
20.5	39.57 8	23.4 28	12.31 13	34.8 2	25.46 16	33.0 14	54.45 28	73.3 27
30.5	39.60 3	26.0 26	12.39 8	35.1 3	25.55 9	34.6 16	54.56 11	76.1 28
Feb. 9.4	39.58 2	28.4 24	12.41 2	35.6 5	25.57 2	36.2 16	54.50 6	78.8 27
	7	20	3	6	5	16	22	26
19.4	39.51	30.4	12.38	36.2	25.52	37.8	54.28	81.4
Mar. 1.4	39.40 11	32.1 17	12.30 8	36.8 6	25.41 11	39.3 15	53.92 36	83.8 24
11.4	39.26 14	33.5 14	12.18 12	37.4 6	25.24 17	40.6 13	53.44 48	85.8 20
21.3	39.09 17	34.5 10	12.03 15	37.9 5	25.04 20	41.7 11	52.86 58	87.3 15
31.3	38.91 18	35.1 6	11.87 16	38.4 5	24.81 23	42.6 9	52.22 64	88.4 11
	19	3	17	4	24	5	67	6
Apr. 10.3	38.72	35.4	11.70	38.8	24.57	43.1	51.55	89.0
20.2	38.53 19	35.3 1	11.53 17	39.1 3	24.33 24	43.3 2	50.88 67	89.0 0
30.2	38.35 18	34.8 5	11.38 15	39.2 1	24.11 22	43.2 1	50.24 64	88.5 5
May 10.2	38.20 15	34.0 8	11.25 13	39.2 0	23.92 19	42.8 4	49.66 58	87.5 10
20.2	38.07 13	32.8 12	11.15 10	39.1 1	23.77 15	42.0 8	49.16 50	86.1 14
	10	15	7	1	11	10	40	19
30.1	37.97	31.3	11.08	39.0	23.66	41.0	48.76	84.2
June 9.1	37.90 7	29.6 17	11.05 3	38.7 3	23.60 6	39.8 12	48.47 29	82.0 22
19.1	37.87 3	27.7 19	11.06 1	38.3 4	23.59 1	38.4 14	48.31 16	79.5 25
29.1	37.88 1	25.6 21	11.10 4	37.9 4	23.63 4	36.9 15	48.27 4	76.8 27
July 9.0	37.92 4	23.4 22	11.18 8	37.4 5	23.72 9	35.3 16	48.36 9	74.0 28
	7	22	12	5	14	17	22	29
19.0	37.99	21.2	11.30	36.9	23.86	33.6	48.58	71.1
29.0	38.10 11	19.0 22	11.45 15	36.3 6	24.05 19	31.9 17	48.92 34	68.2 29
Aug. 7.9	38.25 15	16.9 21	11.63 18	35.7 6	24.28 23	30.1 18	49.38 46	65.3 29
17.9	38.43 18	15.0 19	11.85 22	35.0 7	24.55 27	28.4 17	49.95 57	62.5 28
27.9	38.64 21	13.3 17	12.09 24	34.3 7	24.86 31	26.7 17	50.62 67	59.9 26
	23	14	27	8	34	16	76	23
Sept. 6.9	38.87	11.9	12.36	33.5	25.20	25.1	51.38	57.6
16.8	39.13 26	11.0 9	12.65 29	32.6 9	25.57 37	23.6 15	52.22 84	55.5 21
26.8	39.41 28	10.5 5	12.96 31	31.7 9	25.97 40	22.2 14	53.12 90	53.7 18
Oct. 6.8	39.71 30	10.5 0	13.29 33	30.7 10	26.40 43	20.9 13	54.08 96	52.2 15
16.8	40.02 31	11.0 5	13.63 34	29.7 10	26.84 44	19.8 11	55.08 100	51.2 10
	32	10	35	10	45	9	101	6
26.7	40.34	12.0	13.98	28.7	27.29	18.9	56.09	50.6
Nov. 5.7	40.67 33	13.5 15	14.34 36	27.7 10	27.75 46	18.3 6	57.11 102	50.4 2
15.7	40.99 32	15.4 19	14.69 35	26.8 9	28.20 45	18.0 3	58.11 100	50.7 3
25.6	41.30 31	17.6 22	15.04 35	26.0 8	28.64 44	17.9 1	59.07 96	51.4 7
Dec. 5.6	41.58 28	20.2 26	15.37 33	25.3 7	29.05 41	18.1 2	59.95 88	52.6 12
	25	28	30	5	38	5	79	16
15.6	41.83	23.0	15.67	24.8	29.43	18.6	60.74	54.2
25.6	42.04 21	25.9 29	15.93 26	24.5 3	29.76 33	19.4 8	61.42 68	56.2 20
35.5	42.21 17	28.9 30	16.15 22	24.3 2	30.03 27	20.5 11	61.96 54	58.6 24
Sec δ, Tan δ	1.100	-0.459	1.122	+0.509	1.489	+1.103	3.662	+3.523
Mean Place	38°.119	26'' .88	10°.529	30'' .75	23°.008	27'' .97	48°.314	66'' .68
D'ψ a, Dω a	-0.01	-0.01	+0.01	+0.02	+0.03	+0.03	+0.08	+0.11
Dψ δ, Dω δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9

FOR THE UPPER TRANSIT AT ~~1913-1914~~.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ρ Argus. Mag. 2.9		δ H. Ursæ Majoris. Mag. 5.5		γ Argus. Mag. 2.2		ζ Canori (mean). Mag. 4.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 8 3	° ' -24 2	h m 8 4	° ' +68 43	h m 8 6	° ' -47 4	h m 8 7	° ' +17 5.
	s	"	s	"	s	"	s	"
Jan. 0.6	51.48	60.8	14.22	53.4	52.61	35.3	14.76	43.4
10.5	51.64 16	63.7 29	14.62 40	55.6 22	52.76 15	38.9 36	14.96 20	42.7 1
20.5	51.75 11	66.5 28	14.89 27	58.0 24	52.85 9	42.5 36	15.10 14	42.3 4
30.5	51.80 5	69.1 26	15.03 14	60.6 26	52.87 2	46.0 35	15.19 9	42.1 2
Feb. 9.4	51.80 0	71.5 24	15.04 1	63.2 26	52.82 5	49.2 32	15.23 4	42.0 1
	5	21	11	25	11	30	1	0
19.4	51.75	73.6	14.93	65.7	52.71	52.2	15.22	42.0
Mar. 1.4	51.66 9	75.4 18	14.71 22	68.0 23	52.55 16	54.8 26	15.16 6	42.2 2
11.4	51.53 13	76.9 15	14.39 32	70.0 20	52.34 21	57.0 22	15.06 10	42.5 3
21.3	51.37 16	78.0 11	13.99 40	71.6 16	52.10 24	58.8 18	14.94 12	42.8 3
31.3	51.19 18	78.7 7	13.54 45	72.8 12	51.83 27	60.1 13	14.80 14	43.2 4
	18	4	48	7	28	9	15	3
Apr. 10.3	51.01	79.1	13.06	73.5	51.55	61.0	14.65	43.5
20.3	50.83 18	79.1 0	12.57 49	73.8 3	51.27 28	61.3 3	14.49 16	43.8 3
30.2	50.66 17	78.8 3	12.10 47	73.6 2	51.00 27	61.1 2	14.34 15	44.1 3
May 10.2	50.50 16	78.1 7	11.67 43	72.9 7	50.74 26	60.5 6	14.21 13	44.4 3
20.2	50.36 14	77.1 10	11.29 38	71.7 12	50.51 23	59.4 11	14.11 10	44.6 2
	11	13	31	16	20	15	7	2
30.1	50.25	75.8	10.98	70.1	50.31	57.9	14.04	44.8
June 9.1	50.18 7	74.2 16	10.76 22	68.2 19	50.15 16	56.0 19	14.00 4	44.9 1
19.1	50.14 4	72.4 18	10.63 13	66.0 22	50.03 12	53.7 23	13.99 1	45.0 1
29.1	50.13 1	70.4 20	10.59 4	63.5 25	49.95 8	51.2 25	14.02 3	45.1 1
July 9.0	50.15 2	68.3 21	10.65 6	60.9 26	49.92 3	48.5 27	14.08 6	45.1 0
	6	21	15	27	2	29	9	1
19.0	50.21	66.2	10.80	58.2	49.94	45.6	14.17	45.0
29.0	50.30 9	64.1 21	11.04 24	55.4 28	50.01 7	42.7 29	14.29 12	44.9 1
Aug. 8.0	50.43 13	62.0 21	11.37 33	52.7 27	50.12 11	39.9 28	14.45 16	44.7 2
17.9	50.59 16	60.1 19	11.78 41	50.0 27	50.28 16	37.2 27	14.63 18	44.4 3
27.9	50.78 19	58.4 17	12.26 48	47.4 26	50.49 21	34.7 25	14.84 21	44.0 4
	22	13	56	24	25	21	23	5
Sept. 6.9	51.00	57.1	12.82	45.0	50.74	32.6	15.07	43.5
16.8	51.25 25	56.1 10	13.44 62	42.8 22	51.03 29	30.9 17	15.33 26	42.9 6
26.8	51.52 27	55.6 5	14.12 68	40.9 19	51.36 33	29.8 11	15.61 28	42.1 8
Oct. 6.8	51.81 29	55.5 1	14.84 72	39.2 17	51.72 36	29.2 6	15.91 30	41.2 9
16.8	52.12 31	55.9 4	15.59 75	37.9 13	52.10 38	29.2 0	16.23 32	40.1 11
	32	9	78	9	39	6	33	12
26.7	52.44	56.8	16.37	37.0	52.49	29.8	16.56	38.9
Nov. 5.7	52.77 33	58.2 14	17.15 78	36.5 5	52.89 40	31.1 13	16.90 34	37.7 12
15.7	53.10 33	60.0 18	17.93 78	36.4 1	53.28 39	32.9 18	17.24 34	36.4 13
25.7	53.41 31	62.2 22	18.69 76	36.8 4	53.65 37	35.3 24	17.57 33	35.2 12
Dec. 5.6	53.70 29	64.7 25	19.40 71	37.6 8	53.99 34	38.2 29	17.89 32	34.0 12
	27	28	65	13	30	32	30	11
15.6	53.97	67.5	20.05	38.9	54.29	41.4	18.19	32.9
25.6	54.20 23	70.4 29	20.61 56	40.6 17	54.54 25	44.8 34	18.45 26	31.9 10
35.5	54.39 19	73.4 30	21.07 46	42.6 20	54.74 20	48.4 36	18.67 22	31.1 8
Sec δ , Tan δ	1.095	-0.446	2.757	+2.569	1.468	-1.075	1.051	+0.323
Mean Place	50 ^s .318	70 ^{''} .13	10 ^s .194	53 ^{''} .25	51 ^s .147	47 ^{''} .56	13 ^s .463	39 ^{''} .55
D ψ α , D ω α	-0.01	-0.02	+0.06	+0.09	-0.02	-0.04	+0.01	+0.01
D ψ δ , D ω δ	-0.2	+0.9	-0.2	+0.9	-0.2	+0.9	-0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Bradley 1147. Mag. 5.7		20 Puppis. Mag. 5.0		β Cancri. Mag. 3.8		31 Lynxis. Mag. 4.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 8 8	° ' +76 1	h m 8 9	° ' -15 31	h m 8 11	° ' + 9 27	h m 8 16	° ' +43 27
	s	"	s	"	s	"	s	"
Jan. 0.6	44.74	25.5	21.16	23.4	49.10	20.5	55.03	65.7
10.5	45.30 56	28.0 25	21.33 17	25.9 25	49.29 19	19.4 11	55.29 26	66.6 9
20.5	45.68 38	30.7 27	21.45 12	28.3 24	49.43 14	18.4 10	55.48 19	67.7 11
30.5	45.87 19	33.5 28	21.51 6	30.5 22	49.52 9	17.6 8	55.60 12	68.9 12
Feb. 9.5	45.87 0	36.4 29	21.53 2	32.5 20	49.56 4	17.0 6	55.66 6	70.3 14
	19	27	3	18	1	4	1	15
19.4	45.68	39.1	21.50	34.3	49.55	16.6	55.65	71.8
Mar. 1.4	45.32 36	41.6 25	21.43 7	35.8 15	49.49 6	16.3 3	55.58 7	73.2 14
11.4	44.82 50	43.8 22	21.32 11	37.0 12	49.40 9	16.2 1	55.46 12	74.6 14
21.3	44.20 62	45.6 18	21.18 14	37.8 8	49.28 12	16.3 1	55.29 17	75.8 12
31.3	43.49 71	46.9 13	21.02 16	38.3 5	49.14 14	16.4 1	55.10 19	76.8 10
	75	8	16	3	15	2	21	7
Apr. 10.3	42.74	47.7	20.86	38.6	48.99	16.6	54.89	77.5
20.3	41.98 76	48.0 3	20.69 17	38.6 0	48.84 15	16.9 3	54.67 22	78.0 5
30.2	41.23 75	47.7 3	20.53 16	38.3 3	48.70 14	17.3 4	54.47 20	78.2 2
May 10.2	40.53 70	46.9 8	20.39 14	37.7 6	48.58 12	17.7 4	54.29 18	78.1 1
20.2	39.91 62	45.6 13	20.27 12	36.8 9	48.48 10	18.1 4	54.14 15	77.7 4
	51	18	9	11	7	4	12	6
30.2	39.40	43.8	20.18	35.7	48.41	18.5	54.02	77.1
June 9.1	39.00 40	41.7 21	20.12 6	34.4 13	48.36 5	19.0 5	53.94 8	76.2 9
19.1	38.73 27	39.2 25	20.09 3	32.9 15	48.34 2	19.5 5	53.90 4	75.1 11
29.1	38.60 13	36.5 27	20.09 0	31.2 17	48.36 2	20.0 5	53.91 1	73.8 13
July 9.0	38.62 2	33.6 29	20.12 3	29.5 17	48.41 5	20.4 4	53.96 5	72.4 14
	16	30	6	18	8	4	10	16
19.0	38.78	30.6	20.18	27.7	48.49	20.8	54.06	70.8
29.0	39.08 30	27.6 30	20.27 9	26.0 17	48.61 12	21.2 4	54.20 14	69.2 16
Aug. 8.0	39.51 43	24.6 30	20.40 13	24.3 17	48.75 14	21.5 3	54.38 18	67.5 17
17.9	40.07 56	21.6 30	20.56 16	22.8 15	48.92 17	21.7 2	54.60 22	65.8 17
27.9	40.75 68	18.8 28	20.75 19	21.5 13	49.11 19	21.7 0	54.86 26	64.1 17
	79	26	21	10	22	1	29	17
Sept. 6.9	41.54	16.2	20.96	20.5	49.33	21.6	55.15	62.4
16.9	42.43 89	13.8 24	21.20 24	19.9 6	49.58 25	21.3 3	55.47 32	60.7 17
26.8	43.40 97	11.7 21	21.46 26	19.6 3	49.85 27	20.8 5	55.82 35	59.1 16
Oct. 6.8	44.44 104	10.0 17	21.74 28	19.7 1	50.13 28	20.0 8	56.20 38	57.6 15
16.8	45.53 109	8.7 13	22.04 30	20.2 5	50.43 30	19.0 10	56.60 40	56.2 14
	113	9	31	10	32	11	42	13
26.7	46.66	7.8	22.35	21.2	50.75	17.9	57.02	54.9
Nov. 5.7	47.80 114	7.3 5	22.67 32	22.6 14	51.08 33	16.6 13	57.44 42	53.9 10
15.7	48.93 113	7.3 0	22.99 32	24.3 17	51.40 32	15.1 15	57.87 43	53.1 8
25.7	50.02 109	7.8 5	23.30 31	26.4 21	51.72 32	13.6 15	58.30 43	52.5 6
Dec. 5.6	51.04 102	8.8 10	23.59 29	28.7 23	52.03 31	12.0 16	58.71 41	52.2 3
	93	15	27	25	29	15	38	0
15.6	51.97	10.3	23.86	31.2	52.32	10.5	59.09	52.2
25.6	52.78 81	12.2 19	24.10 24	33.8 26	52.58 26	9.1 14	59.43 34	52.6 4
35.6	53.44 66	14.4 22	24.30 20	36.4 26	52.79 21	7.8 13	59.72 29	53.3 7
Sec δ , Tan δ	4.141	+4.018	1.038	-0.278	1.014	+0.167	1.378	+0.948
Mean Place	38°.597	25''.95	20°.040	31''.68	47°.893	15''.79	53°.172	65''.23
$D^* \delta$, $D_{\infty} \delta$	+0.09	+0.14	-0.01	-0.01	0.00	+0.01	+0.02	+0.04
$D^* \delta$, $D_{\infty} \delta$	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>d</i> ¹ Cancri. Mag. 5.9		<i>ε</i> Argus. Mag. 1.7		30 Monocerotis. Mag. 4.0		O Ursæ Majoris. Mag. 3.5	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 8 18	° ' +18 36	h m 8 20	° ' -59 13	h m 8 21	° ' - 3 37	h m 8 23	° ' +61 0
	s	"	s	"	s	"	s	"
Jan. 0.6	24.35	47.2	45.58	31.2	19.97	12.5	5.82	34.8
10.5	24.56 ²¹	46.6 ⁶	45.76 ¹⁸	35.0 ³⁸	20.16 ¹⁹	14.4 ¹⁹	6.18 ³⁶	36.6 ¹⁸
20.5	24.71 ¹⁵	46.2 ⁴	45.86 ¹⁰	38.8 ³⁸	20.30 ¹⁴	16.2 ¹⁸	6.44 ²⁶	38.6 ²⁰
30.5	24.81 ¹⁰	46.0 ²	45.87 ¹	42.5 ³⁷	20.39 ⁹	17.8 ¹⁶	6.60 ¹⁶	40.7 ²¹
Feb. 9.5	24.86 ⁵	45.9 ¹	45.79 ⁸	46.1 ³⁶	20.43 ⁴	19.2 ¹⁴	6.66 ⁶	43.0 ²³
19.4	24.86	46.0	45.63	49.5	20.42	20.4	6.63	45.3
Mar. 1.4	24.81 ⁵	46.2 ²	45.40 ²³	52.5 ³⁰	20.37 ⁵	21.3 ⁹	6.51 ¹²	47.5 ²²
11.4	24.72 ⁹	46.5 ³	45.11 ²⁹	55.1 ²⁶	20.28 ⁹	22.0 ⁷	6.31 ²⁰	49.5 ²⁰
21.4	24.60 ¹²	46.9 ⁴	44.78 ³³	57.3 ²²	20.16 ¹²	22.5 ⁵	6.05 ²⁶	51.2 ¹⁷
31.3	24.46 ¹⁴	47.3 ⁴	44.41 ³⁷	59.0 ¹⁷	20.02 ¹⁴	22.8 ³	5.74 ³¹	52.5 ¹³
Apr. 10.3	24.31 ¹⁵	47.7 ⁴	44.02 ⁴⁰	60.2 ⁷	19.87 ¹⁵	22.8 ²	5.40 ³⁵	53.4 ⁵
20.3	24.16 ¹⁴	48.1 ³	43.62 ³⁹	60.9 ²	19.72 ¹⁴	22.6 ³	5.05 ³⁴	53.9 ¹
30.2	24.02 ¹³	48.4 ³	43.23 ³⁸	61.1 ³	19.58 ¹³	22.3 ⁵	4.71 ³¹	54.0 ³
May 10.2	23.89 ¹¹	48.7 ²	42.85 ³⁵	60.8 ⁹	19.45 ¹¹	21.8 ⁶	4.40 ²⁷	53.7 ⁸
20.2	23.78 ⁸	48.9 ²	42.50 ³²	59.9 ¹⁴	19.34 ⁸	21.2 ⁸	4.13 ²³	52.9 ¹²
30.2	23.70	49.1	42.18	58.5	19.26	20.4	3.90	51.7
June 9.1	23.65 ⁵	49.2 ¹	41.90 ²⁸	56.7 ¹⁸	19.20 ⁶	19.5 ⁹	3.73 ¹⁷	50.2 ¹⁵
19.1	23.63 ²	49.3 ¹	41.68 ²²	54.6 ²¹	19.17 ³	18.5 ¹⁰	3.62 ¹¹	50.2 ¹⁸
29.1	23.65 ²	49.3 ⁰	41.51 ¹⁷	52.1 ²⁵	19.17 ⁰	17.4 ¹¹	3.58 ⁴	48.4 ²¹
July 9.1	23.70 ⁵	49.3 ⁰	41.40 ¹¹	52.1 ²⁵	19.17 ⁰	17.4 ¹¹	3.58 ⁴	46.3 ²¹
19.0	23.78	49.2	41.35	46.3	19.27	15.2	3.71	41.6
29.0	23.90 ¹²	49.0 ²	41.37 ²	43.2 ³¹	19.36 ⁹	14.1 ¹¹	3.87 ¹⁶	39.1 ²⁵
Aug. 8.0	24.04 ¹⁴	48.7 ³	41.46 ⁹	40.2 ³⁰	19.49 ¹³	13.1 ¹⁰	4.09 ²²	36.5 ²⁶
17.9	24.21 ¹⁷	48.3 ⁴	41.61 ¹⁵	37.2 ³⁰	19.64 ¹⁵	12.2 ⁹	4.38 ²⁹	34.0 ²⁵
27.9	24.41 ²⁰	47.8 ⁵	41.83 ²²	34.4 ²⁸	19.82 ¹⁸	11.5 ⁷	4.72 ³⁴	31.5 ²⁵
Sept. 6.9	24.64	47.2	42.12	32.0	20.02	11.0	5.12	29.1
16.9	24.89 ²⁵	46.5 ⁷	42.46 ³⁴	30.0 ²⁰	20.25 ²³	10.8 ²	5.57 ⁴⁵	26.9 ²²
26.8	25.16 ²⁷	45.6 ⁹	42.85 ³⁹	28.5 ¹⁵	20.50 ²⁵	10.9 ¹	6.06 ⁴⁹	24.8 ²¹
Oct. 6.8	25.45 ²⁹	44.6 ¹⁰	43.28 ⁴³	27.5 ¹⁰	20.78 ²⁸	11.3 ⁴	6.59 ⁵³	22.9 ¹⁹
16.8	25.77 ³²	43.5 ¹¹	43.75 ⁴⁷	27.2 ³	21.07 ²⁹	12.1 ⁸	7.16 ⁵⁷	21.3 ¹⁶
26.8	26.10	42.3	44.24	27.5	21.38	13.2	7.75	20.1
Nov. 5.7	26.44 ³⁴	41.0 ¹³	44.74 ⁵⁰	28.5 ¹⁰	21.69 ³¹	14.6 ¹⁴	8.35 ⁶⁰	19.2 ⁹
15.7	26.78 ³⁴	39.6 ¹⁴	45.23 ⁴⁹	30.1 ¹⁶	22.01 ³²	16.2 ¹⁶	8.96 ⁶¹	18.6 ⁶
25.7	27.12 ³⁴	38.3 ¹³	45.70 ⁴⁷	32.3 ²²	22.33 ³²	18.0 ¹⁸	9.56 ⁶⁰	18.5 ¹
Dec. 5.6	27.45 ³³	37.1 ¹²	46.13 ⁴³	35.1 ²⁸	22.64 ³¹	20.0 ²⁰	10.13 ⁵⁷	18.8 ³
15.6	27.75	36.0	46.50	38.3	22.92	22.1	10.66	19.5
25.6	28.02 ²⁷	35.0 ¹⁰	46.81 ³¹	41.8 ³⁵	23.17 ²⁵	24.2 ²¹	11.13 ⁴⁷	20.7 ¹²
35.6	28.25 ²³	34.2 ⁸	47.04 ²³	45.5 ³⁷	23.38 ²¹	26.2 ²⁰	11.53 ⁴⁰	22.2 ¹⁵
Sec δ, Tan δ	1.055	+0.337	1.955	-1.679	1.002	-0.063	2.063	+1.805
Mean Place	23 ^s .059	43 ^{''} .99	43 ^s .779	45 ^{''} .38	18 ^s .869	18 ^{''} .95	2 ^s .882	36 ^{''} .13
D'ψ α, Dα α	+0.01	+0.01	-0.04	-0.06	0.00	0.00	+0.04	+0.07
Dψ δ, Dα δ	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Chamseleontis. Mag. 4.3		Groombridge 1450. Mag. 6.0		η Cancrī. Mag. 5.5		Groombridge 1446. Mag. 6.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 8 23 s	° ' -77 11 "	h m 8 27 s	° ' +38 18 "	h m 8 27 s	° ' +20 44 "	h m 8 30 s	° ' +73 55 "
Jan. 0.6	20.21	59.5	17.57	56.3	42.11	17.1	9.02	63.4
10.5	20.45 24	63.3 38	17.83 26	56.8 5	42.33 22	16.5 6	9.58 56	65.7 23
20.5	20.51 6	67.2 39	18.02 19	57.5 7	42.50 17	16.2 3	9.99 41	68.2 25
30.5	20.38 13	71.0 38	18.15 13	58.4 9	42.61 11	16.1 1	10.24 25	70.9 27
Feb. 9.5	20.07 31	74.7 37	18.22 7	59.5 11	42.67 6	16.1 0	10.32 8	73.7 28
	48	35	0	12	1	2	9	27
19.4	19.59	78.2	18.22	60.7	42.68	16.3	10.23	76.4
Mar. 1.4	18.96 63	81.4 32	18.17 5	62.0 13	42.64 4	16.7 4	9.99 24	79.0 26
11.4	18.20 76	84.3 29	18.07 10	63.2 12	42.56 8	17.1 4	9.62 37	81.3 23
21.4	17.33 87	86.7 24	17.93 14	64.3 11	42.45 11	17.6 5	9.13 49	83.3 20
31.3	16.39 94	88.7 20	17.76 17	65.3 10	42.31 14	18.1 5	8.56 57	84.8 15
	100	15	19	7	15	5	63	11
Apr. 10.3	15.39	90.2	17.57	66.0	42.16	18.6	7.93	85.9
20.3	14.36 103	91.2 10	17.38 19	66.5 5	42.01 15	19.0 4	7.27 66	86.4 5
30.2	13.33 103	91.7 5	17.19 19	66.8 3	41.86 15	19.3 3	6.62 65	86.4 0
May 10.2	12.32 101	91.6 1	17.02 17	66.9 1	41.72 14	19.6 3	6.01 61	85.9 5
20.2	11.36 96	91.0 6	16.88 14	66.7 2	41.61 11	19.8 2	5.45 56	84.9 10
	90	12	11	4	8	1	48	15
30.2	10.46	89.8	16.77	66.3	41.53	19.9	4.97	83.4
June 9.1	9.65 81	88.2 16	16.70 7	65.7 6	41.47 6	20.0 1	4.58 39	81.5 19
19.1	8.94 71	86.2 20	16.66 4	64.9 8	41.44 3	20.0 0	4.30 28	79.3 22
29.1	8.36 58	83.8 24	16.66 0	63.9 10	41.45 1	19.9 1	4.13 17	76.8 25
July 9.1	7.92 44	81.1 27	16.70 4	62.7 12	41.49 4	19.7 2	4.08 5	74.0 28
	28	30	8	13	7	3	7	30
19.0	7.64	78.1	16.78	61.4	41.56	19.4	4.15	71.0
29.0	7.52 12	75.0 31	16.90 12	60.0 14	41.67 11	19.1 3	4.35 20	68.0 30
Aug. 8.0	7.56 4	71.9 31	17.06 16	58.6 14	41.81 14	18.7 4	4.66 31	64.9 31
17.9	7.77 21	68.8 31	17.25 19	57.1 15	41.98 17	18.2 5	5.09 43	61.9 30
27.9	8.14 37	65.9 29	17.48 23	55.6 15	42.17 19	17.6 6	5.62 53	58.9 30
	53	26	26	16	22	8	63	28
Sept. 6.9	8.67	63.3	17.74	54.0	42.39	16.8	6.25	56.1
16.9	9.35 68	61.0 23	18.03 29	52.4 16	42.64 25	15.9 9	6.97 72	53.5 26
26.8	10.15 80	59.2 18	18.35 32	50.9 15	42.91 27	14.9 10	7.77 80	51.2 23
Oct. 6.8	11.05 90	58.0 12	18.69 34	49.4 15	43.21 30	13.8 11	8.65 88	49.1 21
16.8	12.03 98	57.4 6	19.06 37	47.9 15	43.52 31	12.6 12	9.58 93	47.4 17
	102	0	39	14	33	13	97	13
26.8	13.05	57.4	19.45	46.5	43.85	11.3	10.55	46.1
Nov. 5.7	14.07 102	58.1 7	19.85 40	45.3 12	44.19 34	9.9 14	11.54 99	45.3 8
15.7	15.07 100	59.5 14	20.25 40	44.2 11	44.54 35	8.5 14	12.54 100	45.0 3
25.7	15.99 92	61.5 20	20.65 40	43.4 8	44.89 35	7.2 13	13.52 98	45.1 1
Dec. 5.6	16.82 83	64.0 25	21.04 39	42.8 6	45.22 33	6.0 12	14.46 94	45.7 6
	69	30	36	3	31	11	86	11
15.6	17.51	67.0	21.40	42.5	45.53	4.9	15.32	46.8
25.6	18.04 53	70.4 34	21.73 33	42.5 0	45.81 28	4.0 9	16.09 77	48.4 16
35.6	18.41 37	74.1 37	22.02 29	42.8 3	46.06 25	3.3 7	16.74 65	50.4 20
Sec δ, Tan δ	4.515	-4.403	1.274	+0.790	1.069	+0.379	3.614	+3.473
Mean Place	16°.110	75'' .38	15°.899	55'' .99	40°.811	14'' .54	3°.712	65'' .86
D'φ α, Dω α	-0.09	-0.17	+0.02	+0.03	+0.01	+0.02	+0.07	+0.14
Dφ δ, Dω δ	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8	-0.2	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Hydæ. Mag. 4.2		σ Hydæ. Mag. 4.5		γ Cancri. Mag. 4.7		δ Cancri. Mag. 4.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 8 33	° ' + 6 0	h m 8 34	° ' + 3 38	h m 8 38	° ' +21 46	h m 8 39	° ' +18 28
	s	"	s	"	s	"	s	"
Jan. 0.6	4.23	32.7	13.80	56.3	16.54	57.3	45.84	31.3
10.6	4.43	31.3	14.00	54.7	16.77	56.7	46.07	30.5
20.5	4.59	30.0	14.15	53.3	16.95	56.4	46.25	29.9
30.5	4.70	28.9	14.26	52.1	17.08	56.3	46.37	29.6
Feb. 9.5	4.76	28.0	14.32	51.1	17.15	56.4	46.44	29.5
19.4	4.77	27.4	14.33	50.3	17.17	56.7	46.46	29.6
Mar. 1.4	4.73	27.0	14.29	49.7	17.14	57.1	46.43	29.8
11.4	4.66	26.7	14.22	49.3	17.06	57.6	46.36	30.1
21.4	4.55	26.6	14.11	49.1	16.95	58.2	46.26	30.5
31.3	4.42	26.6	13.98	49.1	16.82	58.8	46.13	31.0
Apr. 10.3	4.28	26.8	13.84	49.2	16.67	59.3	45.99	31.5
20.3	4.14	27.1	13.70	49.4	16.52	59.8	45.84	31.9
30.3	4.00	27.4	13.57	49.8	16.37	60.2	45.69	32.3
May 10.2	3.87	27.8	13.44	50.2	16.23	60.5	45.56	32.6
20.2	3.76	28.3	13.33	50.7	16.12	60.7	45.45	32.9
30.2	3.68	28.8	13.24	51.3	16.03	60.8	45.36	33.1
June 9.1	3.62	29.4	13.18	51.9	15.96	60.8	45.30	33.3
19.1	3.59	30.0	13.15	52.6	15.93	60.7	45.26	33.4
29.1	3.59	30.6	13.15	53.3	15.93	60.6	45.26	33.4
July 9.1	3.62	31.2	13.18	54.1	15.96	60.4	45.29	33.3
19.0	3.68	31.8	13.24	54.8	16.02	60.1	45.35	33.1
29.0	3.77	32.3	13.33	55.4	16.12	59.7	45.44	32.9
Aug. 8.0	3.89	32.7	13.44	56.0	16.25	59.2	45.57	32.6
18.0	4.04	33.0	13.58	56.4	16.41	58.5	45.72	32.2
27.9	4.21	33.2	13.75	56.7	16.59	57.8	45.90	31.6
Sept. 6.9	4.41	33.2	13.95	56.8	16.80	56.9	46.11	30.9
16.9	4.64	33.0	14.17	56.7	17.04	55.9	46.34	30.1
26.8	4.89	32.5	14.42	56.3	17.31	54.8	46.60	29.1
Oct. 5.8	5.16	31.8	14.69	55.6	17.60	53.6	46.88	28.0
15.8	5.45	30.8	14.98	54.7	17.91	52.3	47.18	26.7
25.8	5.76	29.6	15.29	53.5	18.24	50.9	47.50	25.3
Nov. 5.7	6.09	28.2	15.61	52.1	18.58	49.5	47.84	23.9
15.7	6.42	26.6	15.94	50.5	18.93	48.1	48.19	22.4
25.7	6.74	24.9	16.26	48.8	19.28	46.8	48.53	21.0
Dec. 5.7	7.05	23.2	16.57	47.0	19.62	45.5	48.87	19.6
15.6	7.35	21.5	16.87	45.2	19.94	44.4	49.19	18.3
25.6	7.62	19.8	17.14	43.4	20.24	43.5	49.48	17.2
35.6	7.85	18.2	17.36	41.7	20.50	42.8	49.73	16.3
Sec δ, Tan δ	1.006	+0.105	1.002	+0.064	1.077	+0.400	1.054	+0.334
Mean Place	3 ^s .107	28'' .05	12 ^s .691	51'' .25	15 ^s .247	55'' .44	44 ^s .601	28'' .93
D'ψ a, Dω a	0.00	0.00	0.00	0.00	+0.01	+0.02	+0.01	+0.01
Dψ δ, Dω δ	-0.2	+0.8	-0.2	+0.8	-0.3	+0.8	-0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Pyxidis. Mag. 3.7		ι Cancr. Mag. 4.2		ϵ Hydrae. Mag. 3.5		δ Argus. Mag. 2.0	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 8 40	° ' -32 52	h m 8 41	° ' +29 4	h m 8 42	° ' + 6 44	h m 8 42	° ' -54 23
Jan. 0.6	6.82	8.7	27.60	44.3	11.33	23.5	19.32	7.3
10.6	7.01 19	12.0 33	27.84 24	44.2 1	11.54 21	22.1 14	19.53 21	11.0 37
20.5	7.15 14	15.3 33	28.03 19	44.3 1	11.71 17	20.9 12	19.67 14	14.8 38
30.5	7.24 9	18.4 31	28.17 14	44.6 3	11.83 12	19.8 11	19.73 6	18.5 37
Feb. 9.5	7.27 3	21.3 29	28.25 8	45.2 6	11.89 6	18.9 9	19.72 1	22.1 36
19.4	7.24 3	21.3 27	28.25 3	45.2 7	11.89 2	18.9 6	19.72 9	22.1 34
19.4	7.24 8	24.0	28.28	45.9	11.91	18.3	19.63	25.5
Mar. 1.4	7.16 11	26.4 24	28.25 3	46.7 8	11.88 3	17.9 4	19.48 15	28.6 31
11.4	7.05 15	28.4 20	28.17 8	47.6 9	11.81 7	17.7 2	19.27 21	31.4 28
21.4	6.90 18	30.1 17	28.06 11	48.4 8	11.71 10	17.6 1	19.01 26	33.7 23
31.3	6.72 19	31.4 13	27.92 14	49.2 8	11.59 12	17.6 0	18.72 29	35.6 19
Apr. 10.3	6.53 20	32.3 4	27.76 16	49.9 6	11.46 14	17.8 3	18.41 32	37.0 9
20.3	6.33 19	32.7 0	27.60 16	50.5 4	11.32 14	18.1 4	18.09 33	37.9 4
30.3	6.14 18	32.7 3	27.44 15	50.9 3	11.18 13	18.5 4	17.76 32	38.3 1
May 10.2	5.96 17	32.4 7	27.29 13	51.2 1	11.05 11	18.9 4	17.44 30	38.2 6
20.2	5.79 15	31.7 11	27.16 10	51.3 1	10.94 9	19.3 5	17.14 27	37.6 11
30.2	5.64 12	30.6 15	27.06 7	51.2 2	10.85 6	19.8 6	16.87 24	36.5 16
June 9.1	5.52 9	29.1 18	26.99 4	51.0 4	10.79 3	20.4 6	16.63 20	34.9 19
19.1	5.43 6	27.3 20	26.95 1	50.6 5	10.76 1	21.0 6	16.43 16	33.0 23
29.1	5.37 2	25.3 22	26.94 3	50.1 6	10.75 2	21.6 5	16.27 11	30.7 26
July 9.1	5.35 1	23.1 23	26.97 7	49.5 8	10.77 5	22.1 5	16.16 5	28.1 28
19.0	5.36 5	20.8 24	27.04 10	48.7 9	10.82 8	22.6 4	16.11 0	25.3 29
29.0	5.41 8	18.4 24	27.14 13	47.8 9	10.90 11	23.0 4	16.11 6	22.4 30
Aug. 8.0	5.49 12	16.0 22	27.27 16	46.9 10	11.01 14	23.4 3	16.17 12	19.4 29
18.0	5.61 16	13.8 20	27.43 19	45.9 12	11.15 17	23.7 1	16.29 17	16.5 27
27.9	5.77 20	11.8 18	27.62 22	44.7 12	11.32 19	23.8 1	16.46 23	13.8 24
Sept. 6.9	5.97 23	10.0 14	27.84 25	43.5 13	11.51 22	23.7 3	16.69 29	11.4 21
16.9	6.20 26	8.6 10	28.09 28	42.2 14	11.73 24	23.4 6	16.98 33	9.3 16
26.8	6.46 29	7.6 5	28.37 31	40.8 14	11.97 27	22.8 8	17.31 38	7.7 11
Oct. 6.8	6.75 31	7.1 0	28.68 33	39.4 15	12.24 29	22.0 10	17.69 41	6.6 5
16.8	7.06 34	7.1 6	29.01 34	37.9 15	12.53 31	21.0 12	18.10 44	6.1 2
26.8	7.40 35	7.7 12	29.35 36	36.4 14	12.84 32	19.8 14	18.54 45	6.3 8
Nov. 5.7	7.75 35	8.9 17	29.71 37	35.0 13	13.16 33	18.4 16	18.99 45	7.1 15
15.7	8.10 35	10.6 21	30.08 37	33.7 12	13.49 33	16.8 17	19.44 45	8.6 21
25.7	8.45 33	12.7 25	30.45 36	32.5 11	13.82 32	15.1 18	19.89 42	10.7 26
Dec. 5.7	8.78 30	15.2 29	30.81 34	31.4 8	14.14 30	13.3 17	20.31 37	13.3 30
15.6	9.08 27	18.1 31	31.15 31	30.6 6	14.44 27	11.6 17	20.68 32	16.3 34
25.6	9.35 23	21.2 32	31.46 28	30.0 3	14.71 24	9.9 16	21.00 26	19.7 36
35.6	9.58	24.4	31.74	29.7	14.95	8.3	21.26	23.3
Sec δ , Tan δ	1.191	-0.646	1.144	+0.556	1.007	+0.118	1.717	-1.396
Mean Place	5 ^h .740	20 ^m .14	26 ^h .184	43 ^m .76	10 ^h .222	19 ^m .29	17 ^h .895	21 ^m .91
$D^{\circ}\alpha$, $D_{\omega}\alpha$	-0.01	-0.03	+0.01	+0.02	0.00	+0.01	-0.03	-0.06
$D^{\circ}\delta$, $D_{\omega}\delta$	-0.3	+0.8	-0.3	+0.8	-0.3	+0.8	-0.3	+0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ^2 Cancri (<i>mean</i>). Mag. 5.5		ζ Hydræ. Mag. 3.3		ι Ursæ Majoris. Mag. 3.1		α Cancri. Mag. 4.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	<div>h m 8 48</div>	<div>° ' +30 54</div>	<div>h m 8 50</div>	<div>° ' + 6 16</div>	<div>h m 8 53</div>	<div>° ' +48 22</div>	<div>h m 8 53</div>	<div>° ' +12 11</div>
	<div>s s</div>	<div>" "</div>	<div>s s</div>	<div>" "</div>	<div>s s</div>	<div>" "</div>	<div>s s</div>	<div>" "</div>
Jan. 0.6	57.85	34.4	48.88	42.2	17.46	59.5	44.98	45.1
10.6	58.11 ²⁶	34.3 ¹	49.10 ²²	40.8 ¹⁴	17.78 ³²	60.4 ⁹	45.21 ²³	43.9 ¹²
20.5	58.31 ²⁰	34.5 ²	49.28 ¹⁸	39.5 ¹³	18.03 ²⁵	61.6 ¹²	45.40 ¹⁹	42.9 ¹⁰
30.5	58.46 ¹⁵	34.9 ⁴	49.41 ¹³	38.4 ¹¹	18.21 ¹⁸	63.0 ¹⁴	45.53 ¹³	42.2 ⁷
Feb. 9.5	58.55 ⁹	35.5 ⁶	49.48 ⁷	37.5 ⁹	18.32 ¹¹	64.6 ¹⁶	45.61 ⁸	41.7 ⁵
	3	8	2	7	3	17	3	3
19.5	58.58	36.3	49.50	36.8	18.35	66.3	45.64	41.4
Mar. 1.4	58.56 ²	37.3 ¹⁰	49.48 ²	36.3 ⁵	18.31 ⁴	68.1 ¹⁸	45.63 ¹	41.2 ²
	7	10	6	2	10	17	6	0
11.4	58.49 ¹¹	38.3 ⁹	49.42 ⁹	36.1 ¹	18.21 ¹⁵	69.8 ¹⁶	45.57 ⁹	41.2 ²
21.4	58.38 ¹⁴	39.2 ⁹	49.33 ¹²	36.0 ⁰	18.06 ¹⁹	71.4 ¹⁴	45.48 ¹²	41.4 ³
31.3	58.24 ¹⁶	40.1 ⁸	49.21 ¹³	36.0 ²	17.87 ²¹	72.8 ¹¹	45.36 ¹³	41.7 ³
Apr. 10.3	58.08	40.9	49.08	36.2	17.66	73.9	45.23	42.0
20.3	57.91 ¹⁷	41.5 ⁶	48.94 ¹⁴	36.5 ³	17.43 ²³	74.7 ⁸	45.09 ¹⁴	42.4 ⁴
30.3	57.75 ¹⁶	42.0 ⁵	48.81 ¹³	36.8 ³	17.20 ²³	75.2 ⁵	44.95 ¹⁴	42.8 ⁴
May 10.2	57.60 ¹⁵	42.3 ³	48.68 ¹³	37.2 ⁴	16.98 ²²	75.3 ¹	44.82 ¹³	43.2 ⁴
20.2	57.47 ¹³	42.4 ¹	48.57 ¹¹	37.7 ⁵	16.79 ¹⁹	75.1 ²	44.71 ¹¹	43.6 ⁴
	11	1	9	5	17	5	9	4
30.2	57.36	42.3	48.48	38.2	16.62	74.6	44.62	44.0
June 9.2	57.28 ⁸	42.0 ³	48.41 ⁷	38.8 ⁶	16.49 ¹³	73.7 ⁹	44.55 ⁷	44.4 ⁴
19.1	57.23 ⁵	41.6 ⁴	48.37 ⁴	39.4 ⁶	16.40 ⁹	72.6 ¹¹	44.51 ⁴	44.7 ³
29.1	57.22 ¹	41.0 ⁶	48.36 ¹	40.0 ⁶	16.36 ⁴	71.2 ¹⁴	44.50 ¹	45.0 ³
July 9.1	57.24 ²	40.3 ⁷	48.37 ¹	40.5 ⁵	16.36 ⁰	69.6 ¹⁶	44.51 ¹	45.3 ³
	6	9	4	5	5	18	4	2
19.0	57.30	39.4	48.41	41.0	16.41	67.8	44.55	45.5
29.0	57.39 ⁹	38.4 ¹⁰	48.49 ⁸	41.5 ⁵	16.50 ⁹	65.8 ²⁰	44.63 ⁸	45.6 ¹
Aug. 8.0	57.51 ¹²	37.4 ¹⁰	48.59 ¹⁰	41.9 ⁴	16.64 ¹⁴	63.7 ²¹	44.73 ¹⁰	45.6 ⁰
	15	12	13	2	18	21	13	1
18.0	57.66 ¹⁹	36.2 ¹³	48.72 ¹⁶	42.1 ¹	16.82 ²²	61.6 ²²	44.86 ¹⁶	45.5 ²
27.9	57.85 ²²	34.9 ¹⁴	48.88 ¹⁸	42.2 ¹	17.04 ²⁶	59.4 ²²	45.02 ¹⁹	45.3 ⁴
Sept. 6.9	58.07	33.5	49.06	42.1	17.30	57.2	45.21	44.9
16.9	58.32 ²⁵	32.1 ¹⁴	49.27 ²¹	41.8 ³	17.61 ³¹	55.1 ²¹	45.43 ²²	44.3 ⁶
26.9	58.60 ²⁸	30.6 ¹⁵	49.51 ²⁴	41.3 ⁵	17.95 ³⁴	53.0 ²¹	45.67 ²⁴	43.5 ⁸
Oct. 6.8	58.90 ³⁰	29.1 ¹⁵	49.77 ²⁶	40.5 ⁸	18.32 ³⁷	51.0 ²⁰	45.93 ²⁶	42.5 ¹⁰
16.8	59.23 ³³	27.5 ¹⁶	50.06 ²⁹	39.5 ¹⁰	18.73 ⁴¹	49.1 ¹⁹	46.22 ²⁹	41.3 ¹²
	35	15	31	13	43	17	31	14
26.8	59.58	26.0	50.37	38.2	19.16	47.4	46.53	39.9
Nov. 5.7	59.95 ³⁷	24.5 ¹⁵	50.69 ³²	36.7 ¹⁵	19.61 ⁴⁵	46.0 ¹⁴	46.86 ³³	38.4 ¹⁵
15.7	60.32 ³⁷	23.1 ¹⁴	51.02 ³³	35.1 ¹⁶	20.07 ⁴⁶	44.8 ¹²	47.19 ³³	36.8 ¹⁶
25.7	60.70 ³⁸	21.9 ¹²	51.35 ³³	33.4 ¹⁷	20.54 ⁴⁷	43.9 ⁹	47.53 ³⁴	35.2 ¹⁶
Dec. 5.7	61.07 ³⁷	20.9 ¹⁰	51.67 ³²	31.6 ¹⁸	20.99 ⁴⁵	43.4 ⁵	47.86 ³³	33.5 ¹⁷
	35	8	30	18	43	1	32	16
15.6	61.42	20.1	51.97	29.8	21.42	43.3	48.18	31.9
25.6	61.74 ³²	19.5 ⁶	52.25 ²⁸	28.1 ¹⁷	21.82 ⁴⁰	43.5 ²	48.47 ²⁹	30.5 ¹⁴
35.6	62.03 ²⁹	19.2 ³	52.50 ²⁵	26.5 ¹⁶	22.17 ³⁵	44.1 ⁶	48.72 ²⁵	29.2 ¹³
Sec δ , Tan δ	1.166	+0.599	1.006	+0.110	1.506	+1.126	1.023	+0.216
Mean Place	56 ^s .418	34 ^{''} .52	47 ^s .805	38 ^{''} .18	15 ^s .467	62 ^{''} .27	43 ^s .855	42 ^{''} .25
D ψ α , D ω α	+0.01	+0.03	0.00	0.00	+0.02	+0.05	0.00	+0.01
D ψ δ , D ω δ	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	b ¹ Carinæ. Mag. 5.1		κ Ursæ Majoris. Mag. 3.7		σ ² Ursæ Majoris. Mag. 4.9		κ Canori. Mag. 5.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 8 54 s	° ' -58 53 "	h m 8 57 s	° ' +47 29 "	h m 9 2 s	° ' +67 28 "	h m 9 3 s	° ' +11 0 "
Jan. 0.6	52.10	20.5	43.49	61.7	49.02	74.0	3.30	70.7
10.6	52.35 ²⁵	24.2 ³⁷	43.81 ³²	62.5 ⁸	49.52 ⁵⁰	75.7 ¹⁷	3.54 ²⁴	69.4 ¹³
20.5	52.51 ¹⁶	28.0 ³⁸	44.07 ²⁶	63.6 ¹¹	49.91 ³⁹	77.8 ²¹	3.73 ¹⁹	68.3 ¹¹
30.5	52.59 ⁸	31.8 ³⁸	44.26 ¹⁹	65.0 ¹⁴	50.19 ²⁸	80.1 ²³	3.87 ¹⁴	67.5 ⁸
Feb. 9.5	52.58 ¹	35.6 ³⁸	44.37 ¹¹	66.6 ¹⁶	50.35 ¹⁶	82.6 ²⁵	3.96 ⁹	66.9 ⁶
		36	4	17	4	26	4	4
19.5	52.49	39.2	44.41	68.3	50.39	85.2	4.00	66.5
Mar. 1.4	52.33 ¹⁶	42.5 ³³	44.38 ³	70.0 ¹⁷	50.31 ⁸	87.7 ²⁵	3.99 ¹	66.3 ²
11.4	52.11 ²²	45.4 ²⁹	44.29 ⁹	71.7 ¹⁷	50.12 ¹⁹	90.1 ²⁴	3.94 ⁵	66.3 ⁰
21.4	51.83 ²⁸	48.0 ²⁶	44.15 ¹⁴	73.3 ¹⁶	49.84 ²⁸	92.3 ²²	3.86 ⁸	66.4 ¹
31.4	51.51 ³²	50.1 ²¹	43.97 ¹⁸	74.7 ¹⁴	49.49 ³⁵	94.1 ¹⁸	3.75 ¹¹	66.6 ²
	35	16	21	12	41	14	13	3
Apr. 10.3	51.16	51.7	43.76	75.9	49.08	95.5	3.62	66.9
20.3	50.79 ³⁷	52.9 ¹²	43.54 ²²	76.8 ⁹	48.64 ⁴⁴	96.4 ⁹	3.48 ¹⁴	67.3 ⁴
30.3	50.42 ³⁷	53.6 ⁷	43.32 ²²	77.3 ⁵	48.19 ⁴⁵	96.9 ⁵	3.35 ¹³	67.7 ⁴
May 10.2	50.05 ³⁷	53.7 ¹	43.11 ²¹	77.5 ²	47.76 ⁴³	96.9 ⁰	3.22 ¹³	68.2 ⁵
20.2	49.69 ³⁶	53.3 ⁴	42.92 ¹⁹	77.3 ²	47.36 ⁴⁰	96.4 ⁵	3.10 ¹²	68.6 ⁴
	33	9	17	5	36	9	9	4
30.2	49.36	52.4	42.75	76.8	47.00	95.5	3.01	69.0
June 9.2	49.07 ²⁹	51.0 ¹⁴	42.62 ¹³	76.0 ⁸	46.69 ³¹	94.1 ¹⁴	2.94 ⁷	69.4 ⁴
19.1	48.82 ²⁵	49.2 ¹⁸	42.53 ⁹	74.9 ¹¹	46.45 ²⁴	92.3 ¹⁸	2.89 ⁵	69.8 ⁴
29.1	48.61 ²¹	47.0 ²²	42.49 ⁴	73.6 ¹³	46.28 ¹⁷	90.1 ²²	2.87 ²	70.2 ⁴
July 9.1	48.45 ¹⁶	44.5 ²⁵	42.49 ⁰	72.1 ¹⁵	46.20 ⁸	87.7 ²⁴	2.88 ¹	70.5 ³
	10	28	4	18	0	26	4	2
19.0	48.35	41.7	42.53	70.3	46.20	85.1	2.92	70.7
29.0	48.32 ³	38.8 ²⁹	42.62 ⁹	68.4 ¹⁹	46.28 ⁸	82.3 ²⁸	2.98 ⁶	70.9 ²
Aug. 8.0	48.35 ³	35.8 ³⁰	42.75 ¹³	66.4 ²⁰	46.44 ¹⁶	79.3 ³⁰	3.07 ⁹	71.0 ¹
18.0	48.45 ¹⁰	32.8 ³⁰	42.92 ¹⁷	64.3 ²¹	46.68 ²⁴	76.3 ³⁰	3.19 ¹²	70.9 ¹
27.9	48.61 ¹⁶	29.9 ²⁹	43.13 ²¹	62.2 ²¹	47.00 ³²	73.3 ³⁰	3.34 ¹⁵	70.7 ²
	23	26	26	22	39	29	18	4
Sept. 6.9	48.84	27.3	43.39	60.0	47.39	70.4	3.52	70.3
16.9	49.13 ²⁹	25.1 ²²	43.68 ²⁹	57.8 ²²	47.86 ⁴⁷	67.6 ²⁸	3.73 ²¹	69.7 ⁶
26.9	49.48 ³⁵	23.3 ¹⁸	44.01 ³³	55.7 ²¹	48.39 ⁵³	64.9 ²⁷	3.96 ²³	68.9 ⁸
Oct. 6.8	49.88 ⁴⁰	22.0 ¹³	44.38 ³⁷	53.6 ²¹	48.98 ⁵⁹	62.5 ²⁴	4.22 ²⁶	67.9 ¹⁰
16.8	50.33 ⁴⁵	21.3 ⁷	44.78 ⁴⁰	51.7 ¹⁹	49.63 ⁶⁵	60.4 ²¹	4.50 ²⁸	66.7 ¹²
	48	0	42	17	69	18	31	13
26.8	50.81	21.3	45.20	50.0	50.32	58.6	4.81	65.4
Nov. 5.7	51.31 ⁵⁰	21.9 ⁶	45.64 ⁴⁴	48.5 ¹⁵	51.04 ⁷²	57.2 ¹⁴	5.13 ³²	63.9 ¹⁵
15.7	51.81 ⁵⁰	23.1 ¹²	46.10 ⁴⁶	47.2 ¹³	51.78 ⁷⁴	56.2 ¹⁰	5.46 ³³	62.2 ¹⁷
25.7	52.30 ⁴⁹	25.0 ¹⁹	46.56 ⁴⁶	46.3 ⁹	52.52 ⁷⁴	55.7 ⁵	5.80 ³⁴	60.5 ¹⁷
Dec. 5.7	52.77 ⁴⁷	27.5 ²⁵	47.01 ⁴⁵	45.7 ⁶	53.25 ⁷³	55.6 ¹	6.13 ³³	58.8 ¹⁷
	42	29	43	2	69	4	32	17
15.6	53.19	30.4	47.44	45.5	53.94	56.0	6.45	57.1
25.6	53.55 ³⁶	33.7 ³³	47.84 ⁴⁰	45.7 ²	54.57 ⁶³	57.0 ¹⁰	6.75 ³⁰	55.5 ¹⁶
35.6	53.85 ³⁰	37.3 ³⁶	48.19 ³⁵	46.2 ⁵	55.12 ⁵⁵	58.4 ¹⁴	7.01 ²⁶	54.1 ¹⁴
Sec δ, Tan δ	1.936	-1.657	1.480	+1.091	2.612	+2.413	1.019	+0.195
Mean Place	50 ^s .627	36 ^{''} .17	41 ^s .555	64 ^{''} .74	45 ^s .354	79 ^{''} .21	2 ^s .213	68 ^{''} .00
D' α, D α	-0.03	-0.08	+0.02	+0.05	+0.04	+0.12	0.00	+0.01
D' δ, D α δ	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Argūs. Mag. 2.2		θ Hydre. Mag. 3.8		β Argūs. Mag. 1.8		δ Cancri. Mag. 6.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 9 4	° ' -43 4	h m 9 9	° ' + 2 40	h m 9 12	° ' -69 21	h m 9 14	° ' +18 4
	s	"	s	"	s	"	s	"
Jan. 0.6	48.76	38.2	51.35	59.1	16.86	13.9	8.85	29.8
10.6	48.99 ²³	41.7 ³⁵	51.59 ²⁴	57.4 ¹⁷	17.20 ³⁴	17.6 ³⁷	9.11 ²⁶	28.8 ¹⁰
20.5	49.16 ¹⁷	45.3 ³⁶	51.78 ¹⁹	55.8 ¹⁶	17.43 ²³	21.5 ³⁹	9.32 ²¹	28.1 ⁷
30.5	49.27 ¹¹	48.8 ³⁵	51.92 ¹⁴	54.4 ¹⁴	17.54 ¹¹	25.4 ³⁹	9.48 ¹⁶	27.7 ⁴
Feb. 9.5	49.32 ⁵	52.2 ³⁴	52.01 ⁹	53.2 ¹²	17.53 ¹	29.3 ³⁹	9.58 ¹⁰	27.5 ²
19.5	49.30 ²	55.4 ³²	52.05 ⁴	52.3 ⁹	17.40 ¹³	33.1 ³⁸	9.63 ⁵	27.5 ⁰
Mar. 1.4	49.23 ⁷	58.3 ²⁹	52.05 ⁰	51.6 ⁷	17.40 ²³	33.1 ³⁶	9.63 ¹	27.5 ²
11.4	49.23 ¹²	58.3 ²⁶	52.05 ⁴	51.6 ⁵	17.17 ³²	36.7 ³³	9.64 ⁴	27.7 ⁴
21.4	49.11 ¹⁶	60.9 ²²	52.01 ⁸	51.1 ³	16.85 ⁴⁰	40.0 ²⁹	9.60 ⁸	28.1 ⁵
31.4	48.95 ¹⁹	63.1 ¹⁸	51.93 ¹¹	50.8 ¹	16.45 ⁴⁷	42.9 ²⁵	9.52 ¹⁰	28.5 ⁵
Apr. 10.3	48.76 ²¹	64.9 ¹⁴	51.82 ¹³	50.7 ¹	15.98 ⁵²	45.4 ²¹	9.42 ¹³	29.0 ⁶
20.3	48.55 ²³	66.3 ⁹	51.69 ¹³	50.8 ²	15.46 ⁵⁶	47.5 ¹⁶	9.29 ¹⁴	29.6 ⁵
30.3	48.32 ²³	67.2 ⁵	51.56 ¹³	51.0 ³	14.90 ⁵⁷	49.1 ¹¹	9.15 ¹⁴	30.1 ⁵
May 10.2	48.09 ²³	67.7 ⁰	51.43 ¹²	51.3 ⁴	14.33 ⁵⁷	50.2 ⁵	9.01 ¹³	30.6 ⁵
20.2	47.86 ²²	67.7 ⁵	51.31 ¹¹	51.7 ⁵	13.76 ⁵⁷	50.7 ⁰	8.88 ¹²	31.1 ⁴
30.2	47.64 ²⁰	67.2 ⁹	51.20 ¹⁰	52.2 ⁶	13.19 ⁵⁴	50.7 ⁵	8.76 ¹⁰	31.5 ³
June 9.2	47.44 ¹⁷	66.3 ¹³	51.10 ⁸	52.8 ⁶	12.64 ⁵¹	50.2 ¹¹	8.66 ⁸	31.8 ²
19.1	47.27 ¹⁴	65.0 ¹⁶	51.02 ⁵	53.4 ⁶	12.13 ⁴⁵	49.1 ¹⁵	8.58 ⁵	32.0 ¹
29.1	47.13 ¹¹	63.4 ²⁰	50.97 ³	54.0 ⁷	11.68 ³⁹	47.6 ²⁰	8.53 ³	32.1 ¹
July 9.1	47.02 ⁷	61.4 ²³	50.94 ⁰	54.7 ⁷	11.29 ³²	45.6 ²⁴	8.50 ⁰	32.2 ⁰
19.1	46.95 ⁴	59.1 ²⁴	50.94 ³	55.4 ⁷	10.97 ²⁴	43.2 ²⁶	8.50 ³	32.2 ²
29.0	46.91 ⁰	56.7 ²⁶	50.97 ⁵	56.1 ⁶	10.73 ¹⁵	40.6 ²⁹	8.53 ⁶	32.0 ³
Aug. 8.0	46.91 ⁵	54.1 ²⁷	51.02 ⁸	56.7 ⁵	10.58 ⁶	37.7 ³¹	8.59 ⁸	31.7 ⁴
18.0	46.96 ⁹	51.4 ²⁶	51.10 ¹¹	57.2 ⁴	10.52 ⁵	34.6 ³¹	8.67 ¹¹	31.3 ⁵
27.9	47.05 ¹³	48.8 ²⁴	51.21 ¹⁴	57.6 ³	10.57 ¹⁵	31.5 ³⁰	8.78 ¹⁵	30.8 ⁷
Sept. 6.9	47.18 ¹⁸	46.4 ²²	51.35 ¹⁷	57.9 ⁰	10.72 ²⁵	28.5 ²⁸	8.93 ¹⁷	30.1 ⁸
16.9	47.36 ²²	44.2 ¹⁹	51.52 ¹⁹	57.9 ²	10.97 ³⁶	25.7 ²⁵	9.10 ²⁰	29.3 ¹⁰
26.9	47.58 ²⁶	42.3 ¹⁴	51.71 ²²	57.7 ⁴	11.33 ⁴⁵	23.2 ²¹	9.30 ²⁴	28.3 ¹¹
Oct. 6.8	47.84 ³⁰	40.9 ⁹	51.93 ²⁵	57.3 ⁷	11.78 ⁵³	21.1 ¹⁷	9.54 ²⁶	27.2 ¹³
16.8	48.14 ³⁴	40.0 ⁴	52.18 ²⁷	56.6 ¹⁰	12.31 ⁶⁰	19.4 ¹¹	9.80 ²⁸	25.9 ¹⁴
26.8	48.48 ³⁷	39.6 ¹	52.45 ³⁰	55.6 ¹²	12.91 ⁶⁵	18.3 ⁵	10.08 ³¹	24.5 ¹⁵
Nov. 5.8	48.85 ³⁸	39.7 ⁸	52.75 ³²	54.4 ¹⁵	13.56 ⁶⁸	17.8 ²	10.39 ³³	23.0 ¹⁶
15.7	49.23 ³⁹	40.5 ¹⁴	53.07 ³³	52.9 ¹⁷	14.24 ⁶⁹	18.0 ⁹	10.72 ³⁴	21.4 ¹⁷
25.7	49.62 ³⁹	41.9 ¹⁹	53.40 ³³	51.2 ¹⁹	14.93 ⁶⁸	18.9 ¹⁵	11.06 ³⁵	19.7 ¹⁷
Dec. 5.7	50.01 ³⁷	43.8 ²⁴	53.73 ³²	49.3 ¹⁹	15.61 ⁶⁵	20.4 ²¹	11.41 ³⁵	18.0 ¹⁶
15.6	50.38 ³⁵	46.2 ²⁸	54.05 ³¹	47.4 ²⁰	16.26 ⁵⁹	22.5 ²⁷	11.76 ³³	16.4 ¹⁵
25.6	50.73 ³¹	49.0 ³²	54.36 ²⁹	45.4 ¹⁹	16.85 ⁵¹	25.2 ³²	12.09 ³¹	14.9 ¹³
35.6	51.04 ²⁷	52.2 ³⁵	54.65 ²⁶	43.5 ¹⁸	17.36 ⁴¹	28.4 ³⁵	12.40 ²⁸	13.6 ¹¹
35.6	51.31 ²⁷	55.7 ³⁵	54.91 ²⁶	41.7 ¹⁸	17.77 ⁴¹	31.9 ³⁵	12.68 ²⁸	12.5 ¹¹
Sec δ , Tan δ	1.369	-0.935	1.001	+0.047	2.837	-2.655	1.052	+0.326
Mean Place	47°.725	51''.88	50°.365	54''.90	14°.984	31''.56	7°.717	28''.99
D' ψ α , D ω α	-0.02	-0.04	0.00	0.00	-0.05	-0.13	+0.01	+0.02
D ψ δ , D ω δ	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ι Argus. Mag. 2.2		40 Lynce. Mag. 3.3		θ Pyxidis. Mag. 4.9		α Hydre. Mag. 2.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 9 14 s	° ' -58 54 "	h m 9 15 s	° ' +34 45 "	h m 9 17 s	° ' -25 35 "	h m 9 23 s	° ' - 8 16 "
Jan. 0.6	46.85	18.9	47.00	37.4	39.14	31.9	19.62	45.0
10.6	47.13 28	22.6 37	47.29 29	37.3 1	39.37 23	34.9 30	19.86 24	47.3 23
20.6	47.34 21	26.4 38	47.53 24	37.6 3	39.56 19	37.9 30	20.06 20	49.5 22
30.5	47.46 12	30.2 38	47.71 18	38.2 6	39.69 13	40.8 29	20.21 15	51.5 20
Feb. 9.5	47.49 3	34.0 38	47.83 12	39.0 8	39.77 8	43.6 28	20.31 10	53.3 18
	5	37	7	10	3	25	5	16
19.5	47.44	37.7	47.90	40.0	39.80	46.1	20.36	54.9
Mar. 1.4	47.32 12	41.1 34	47.90 0	41.2 12	39.78 2	48.3 22	20.36 0	56.3 14
11.4	47.13 19	44.2 31	47.85 5	42.4 12	39.72 6	50.3 20	20.32 4	57.4 11
21.4	46.89 24	47.0 28	47.76 9	43.6 12	39.62 10	51.9 16	20.24 8	58.2 8
31.4	46.60 29	49.4 24	47.63 13	44.7 11	39.49 13	53.2 13	20.14 10	58.8 6
	33	19	15	11	15	9	12	3
Apr. 10.3	46.27	51.3	47.48	45.8	39.34	54.1	20.02	59.1
20.3	45.92 35	52.7 14	47.31 17	46.7 9	39.18 16	54.7 6	19.89 13	59.2 1
30.3	45.56 36	53.6 9	47.14 17	47.3 6	39.02 16	54.9 2	19.76 13	59.1 1
May 10.3	45.20 36	54.0 4	46.98 16	47.7 4	38.86 16	54.8 1	19.63 13	58.8 3
20.2	44.85 35	53.8 2	46.83 15	47.9 2	38.71 15	54.4 4	19.51 12	58.3 5
	33	6	13	0	13	8	11	6
30.2	44.52	53.2	46.70	47.9	38.58	53.6	19.40	57.7
June 9.2	44.21 31	52.1 11	46.60 10	47.7 2	38.47 11	52.5 11	19.31 9	56.9 8
19.1	43.94 27	50.5 16	46.53 7	47.2 5	38.38 9	51.2 13	19.24 7	55.9 10
29.1	43.71 23	48.5 20	46.49 4	46.5 7	38.31 7	49.6 16	19.20 4	54.8 11
July 9.1	43.53 18	46.1 24	46.48 1	45.6 9	38.27 4	47.8 18	19.18 2	53.7 11
	12	26	2	10	1	19	1	11
19.1	43.41	43.5	46.50	44.6	38.26	45.9	19.19	52.6
29.0	43.34 7	40.7 28	46.56 6	43.4 12	38.28 2	44.0 19	19.23 4	51.4 12
Aug. 8.0	43.33 1	37.8 29	46.66 10	42.0 14	38.33 5	42.0 20	19.29 6	50.3 11
	6	30	13	15	9	19	9	10
18.0	43.39	34.8	46.79	40.5	38.42	40.1	19.38	49.3
28.0	43.52 13	31.9 29	46.95 16	38.9 16	38.54 12	38.4 17	19.50 12	48.4 9
	20	27	19	17	15	15	15	6
Sept. 6.9	43.72	29.2	47.14	37.2	38.69	36.9	19.65	47.8
16.9	43.98 26	26.9 23	47.37 23	35.4 18	38.88 19	35.7 12	19.82 17	47.4 4
26.9	44.31 33	25.0 19	47.63 26	33.6 18	39.10 22	34.8 9	20.03 21	47.3 1
Oct. 6.8	44.70 39	23.5 15	47.93 30	31.8 18	39.36 26	34.4 4	20.27 24	47.6 3
16.8	45.13 43	22.6 9	48.25 32	29.9 19	39.64 28	34.5 1	20.54 27	48.2 6
	47	3	35	18	31	5	29	10
26.8	45.60	22.3	48.60	28.1	39.95	35.0	20.83	49.2
Nov. 5.8	46.10 50	22.7 4	48.97 37	26.4 17	40.28 33	36.0 10	21.14 31	50.5 13
15.7	46.61 51	23.7 10	49.36 39	24.8 16	40.62 34	37.5 15	21.46 32	52.1 16
25.7	47.11 50	25.3 16	49.75 39	23.4 14	40.96 34	39.4 19	21.79 33	54.0 19
Dec. 5.7	47.59 48	27.6 23	50.14 39	22.2 12	41.30 34	41.7 23	22.12 33	56.2 22
	45	28	38	9	32	26	32	23
15.7	48.04	30.4	50.52	21.3	41.62	44.3	22.44	58.5
25.6	48.43 39	33.6 32	50.87 35	20.8 5	41.92 30	47.1 28	22.74 30	60.8 23
35.6	48.76 33	37.0 34	51.19 32	20.5 3	42.18 26	50.1 30	23.00 26	63.2 24
Sec δ, Tan δ	1.937	-1.658	1.217	+0.694	1.109	-0.479	1.011	-0.146
Mean Place	45°.574	35''.35	45°.551	39''.84	38°.278	42''.38	18°.756	51''.38
D'φ α, Dα α	-0.03	-0.08	+0.01	+0.03	-0.01	-0.02	0.00	-0.01
Dφ δ, Dα δ	-0.3	+0.7	-0.3	+0.7	-0.3	+0.7	-0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	h Ursæ Majoris. Mag. 3.8		d Ursæ Majoris. Mag. 4.6		θ Ursæ Majoris. Mag. 3.3		ξ Leonis. Mag. 5.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 9 24 s	° ' " +63 26 "	h m 9 26 s	° ' " +70 12 "	h m 9 27 s	° ' " +52 4 "	h m 9 27 s	° ' " +11 40 "
Jan. 0.6	44.12	27.8	52.77	41.2	4.86	22.4	16.51	69.9
10.6	44.60 48	29.2 14	53.37 60	42.7 15	5.23 37	23.1 7	16.77 26	68.5 14
20.6	44.99 39	30.9 17	53.86 49	44.7 20	5.54 31	24.3 12	16.98 21	67.4 11
30.5	45.29 30	32.9 20	54.23 37	47.0 23	5.78 24	25.8 15	17.14 16	66.5 9
Feb. 9.5	45.48 19	35.2 23	54.46 23	49.6 26	5.94 16	27.5 17	17.26 12	65.9 6
	9	25	10	27	8	19	7	4
19.5	45.57	37.7	54.56	52.3	6.02	29.4	17.33	65.5
Mar. 1.5	45.55 2	40.2 25	54.52 4	55.0 27	6.02 0	31.4 20	17.34 1	65.3 2
11.4	45.44 11	42.6 24	54.35 17	57.6 26	5.96 6	33.4 20	17.31 3	65.3 0
21.4	45.24 20	44.8 22	54.08 27	60.0 24	5.83 13	35.3 19	17.24 7	65.5 2
31.4	44.98 26	46.7 19	53.72 36	62.1 21	5.65 18	37.0 17	17.15 9	65.8 3
	32	16	44	17	21	15	11	4
Apr. 10.3	44.66	48.3	53.28	63.8	5.44	38.5	17.04	66.2
20.3	44.31 35	49.5 12	52.80 48	65.0 12	5.20 24	39.7 12	16.91 13	66.6 4
30.3	43.95 36	50.3 8	52.30 50	65.8 8	4.95 25	40.5 8	16.78 13	67.0 4
May 10.3	43.59 36	50.6 3	51.79 51	66.0 2	4.71 24	40.9 4	16.65 13	67.5 5
20.2	43.24 35	50.4 2	51.30 49	65.7 3	4.48 23	40.9 0	16.53 12	68.0 5
	32	6	45	7	21	4	10	4
30.2	42.92	49.8	50.85	65.0	4.27	40.5	16.43	68.4
June 9.2	42.65 27	48.7 11	50.45 40	63.8 12	4.10 17	39.8 7	16.35 8	68.8 4
19.2	42.43 22	47.2 15	50.12 33	62.1 17	3.96 14	38.8 10	16.29 6	69.2 4
29.1	42.27 16	45.4 18	49.86 26	60.0 21	3.86 10	37.4 14	16.26 3	69.5 3
July 9.1	42.17 10	43.3 21	49.69 17	57.6 24	3.80 6	35.7 17	16.25 1	69.7 2
	4	24	8	26	1	19	1	2
19.1	42.13	40.9	49.61	55.0	3.79	33.8	16.26	69.9
29.0	42.16 3	38.2 27	49.61 0	52.1 29	3.83 4	31.6 22	16.30 4	70.0 1
Aug. 8.0	42.26 10	35.4 28	49.71 10	49.0 31	3.92 9	29.3 23	16.37 7	70.0 0
18.0	42.43 17	32.5 29	49.90 19	45.8 32	4.05 13	26.9 24	16.47 10	69.8 2
28.0	42.66 23	29.6 29	50.18 28	42.6 32	4.23 18	24.4 25	16.60 13	69.5 3
	30	30	37	31	23	26	16	5
Sept. 6.9	42.96	26.6	50.55	39.5	4.46	21.8	16.76	69.0
16.9	43.32 36	23.7 29	51.00 45	36.4 31	4.73 27	19.2 26	16.94 18	68.3 7
26.9	43.75 43	20.9 28	51.53 53	33.4 30	5.04 31	16.7 25	17.15 21	67.4 9
Oct. 6.9	44.23 48	18.3 26	52.14 61	30.7 27	5.40 36	14.2 25	17.39 24	66.3 11
16.8	44.76 53	15.9 24	52.82 68	28.2 25	5.80 40	11.9 23	17.66 27	65.0 13
	57	21	73	21	44	21	30	15
26.8	45.33	13.8	53.55	26.1	6.24	9.8	17.96	63.5
Nov. 5.8	45.94 61	12.0 18	54.33 78	24.4 17	6.70 46	8.0 18	18.28 32	61.9 16
15.7	46.58 64	10.6 14	55.14 81	23.1 13	7.18 48	6.4 16	18.61 33	60.2 17
25.7	47.23 65	9.7 9	55.97 83	22.3 8	7.68 50	5.2 12	18.95 34	58.4 18
Dec. 5.7	47.87 64	9.3 4	56.78 81	22.0 3	8.17 49	4.4 8	19.29 34	56.6 18
	62	0	78	2	47	4	33	18
15.7	48.49	9.3	57.56	22.2	8.64	4.0	19.62	54.8
25.6	49.07 58	9.8 5	58.29 73	22.9 7	9.09 45	4.0 0	19.93 31	53.1 17
35.6	49.60 53	10.8 10	58.95 66	24.2 13	9.50 41	4.5 5	20.21 28	51.7 14
Sec δ, Tan δ	2.236	+2.001	2.954	+2.779	1.627	+1.283	1.021	+0.207
Mean Place	41 ^s .126	34 ^{''} .74	48 ^s .737	48 ^{''} .73	2 ^s .793	28 ^{''} .28	15 ^s .499	68 ^{''} .27
D'ψ a, Dω a	+0.03	+0.10	+0.05	+0.15	+0.02	+0.07	0.00	+0.01
Dψ δ, Dω δ	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Antliae. Mag. 5.0		ϵ Leonis. Mag. 3.1		ν Ursae Majoris. Mag. 3.9		ν Argus. Mag. 3.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 9 40 s	° ' -27 22 "	h m 9 40 s	° ' +24 10 "	h m 9 44 s	° ' +59 26 "	h m 9 44 s	° ' -64 39 "
Jan. 0.6	20.13	3.8	56.08	29.1	51.35	46.6	56.82	47.9
10.6	20.38 25	6.8 30	56.37 29	28.3 8	51.81 46	47.5 9	57.19 37	51.4 35
20.6	20.59 21	9.8 30	56.61 24	27.9 4	52.19 38	48.9 14	57.48 29	55.1 37
30.5	20.75 16	12.8 30	56.80 19	27.7 2	52.49 30	50.6 17	57.67 19	59.0 39
Feb. 9.5	20.86 11	15.7 29	56.94 14	27.8 1	52.70 21	52.7 21	57.77 10	62.9 39
	5	26	9	3	12	23	0	39
19.5	20.91	18.3	57.03	28.1	52.82	55.0	57.77	66.8
Mar. 1.5	20.91 0	20.7 24	57.06 3	28.7 6	52.85 3	57.3 23	57.68 9	70.5 37
11.4	20.87 4	22.8 21	57.05 1	29.4 7	52.79 6	59.7 24	57.51 17	74.0 35
21.4	20.79 8	24.6 18	56.99 6	30.2 8	52.66 13	61.9 22	57.26 25	77.1 31
31.4	20.68 11	26.1 15	56.90 9	31.1 9	52.46 20	63.9 20	56.95 31	79.9 28
	13	12	12	8	25	17	36	24
Apr. 10.4	20.55	27.3	56.78	31.9	52.21	65.6	56.59	82.3
20.3	20.40 15	28.1 8	56.65 13	32.7 8	51.92 29	67.0 14	56.19 40	84.2 19
30.3	20.24 16	28.5 4	56.51 14	33.4 7	51.62 30	68.0 10	55.77 42	85.6 14
May 10.3	20.09 15	28.6 1	56.37 14	34.0 6	51.31 31	68.6 6	55.34 43	86.5 9
20.2	19.94 15	28.3 3	56.24 13	34.5 5	51.01 30	68.7 1	54.91 43	86.9 4
	14	6	11	3	28	3	43	1
30.2	19.80	27.7	56.13	34.8	50.73	68.4	54.48	86.8
June 9.2	19.67 13	26.8 9	56.03 10	34.9 1	50.48 25	67.6 8	54.07 41	86.1 7
19.2	19.56 11	25.6 12	55.96 7	34.9 0	50.28 20	66.4 12	53.70 37	84.9 12
29.1	19.48 8	24.1 15	55.91 5	34.7 2	50.12 16	64.9 15	53.37 33	83.3 16
July 9.1	19.42 6	22.4 17	55.88 3	34.4 3	50.01 11	63.0 19	53.09 28	81.2 21
	3	18	0	5	6	22	23	24
19.1	19.39	20.6	55.88	33.9	49.95	60.8	52.86	78.8
29.1	19.39 0	18.7 19	55.92 4	33.3 6	49.95 0	58.4 24	52.70 16	76.1 27
Aug. 8.0	19.42 3	16.7 20	55.98 6	32.5 8	50.00 5	55.8 26	52.61 9	73.3 28
18.0	19.48 6	14.8 19	56.07 9	31.6 9	50.11 11	53.0 28	52.60 1	70.3 30
28.0	19.58 10	13.0 18	56.19 12	30.5 11	50.28 17	50.1 29	52.68 8	67.3 30
	13	16	15	12	23	29	16	28
Sept. 6.9	19.71	11.4	56.34	29.3	50.51	47.2	52.84	64.5
16.9	19.88 17	10.1 13	56.53 19	27.9 14	50.80 29	44.3 29	53.08 24	61.9 26
26.9	20.08 20	9.1 10	56.75 22	26.3 16	51.14 34	41.4 29	53.41 33	59.6 23
Oct. 6.9	20.32 24	8.5 6	56.99 24	24.7 16	51.53 39	38.6 28	53.82 41	57.7 19
16.8	20.59 27	8.3 2	57.27 28	23.0 17	51.97 44	36.0 26	54.29 47	56.3 14
	31	4	31	18	49	23	53	7
26.8	20.90	8.7	57.58	21.2	52.46	33.7	54.82	55.6
Nov. 5.8	21.23 33	9.6 9	57.91 33	19.3 19	52.99 53	31.6 21	55.39 57	55.5 1
15.8	21.57 34	10.9 13	58.26 35	17.4 19	53.55 56	29.9 17	55.98 59	56.1 6
25.7	21.92 35	12.7 18	58.62 36	15.6 18	54.12 57	28.6 13	56.58 60	57.3 12
Dec. 5.7	22.27 35	14.9 22	58.98 36	14.0 16	54.70 58	27.8 8	57.17 59	59.1 18
	34	25	36	14	57	4	55	24
15.7	22.61	17.4	59.34	12.6	55.27	27.4	57.72	61.5
25.6	22.93 32	20.2 28	59.68 34	11.4 12	55.81 54	27.5 1	58.22 50	64.4 29
35.6	23.21 28	23.2 30	59.99 31	10.4 10	56.30 49	28.1 6	58.65 43	67.8 34
Sec δ , Tan δ	1.126	-0.518	1.096	+0.449	1.967	+1.694	2.337	-2.112
Mean Place	19 ^s .388	14'' .61	54 ^s .949	31'' .00	48 ^s .866	54'' .81	55 ^s .686	65'' .98
D ψ α , D ω α	-0.01	-0.03	+0.01	+0.02	+0.02	+0.09	-0.03	-0.12
D ψ δ , D ω δ	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6	-0.3	+0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	6 Sextantis. Mag. 6.0		μ Leonis. Mag. 4.1		Groombridge 1586. Mag. 6.0		19 Leonis Minoris. Mag. 5.2	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 9 46	° ' - 3 50	h m 9 47	° ' +26 24	h m 9 50	° ' +73 17	h m 9 52	° ' +41 27
Jan. 0.6	51.83	1.6	50.23	59.2	42.44	27.9	23.15	67.7
10.6	52.09 26	3.8 22	50.53 30	58.5 7	43.18 74	29.4 15	23.50 35	67.7 0
20.6	52.31 22	5.8 20	50.78 25	58.1 4	43.80 62	31.3 19	23.80 30	68.1 4
30.5	52.48 17	7.6 18	50.98 20	58.1 0	44.29 49	33.6 23	24.04 24	68.9 8
Feb. 9.5	52.60 12	9.2 16	51.13 15	58.3 2	44.62 33	36.2 26	24.21 17	70.0 11
	8	14	9	5	18	27	11	14
19.5	52.68	10.6	51.22	58.8	44.80	38.9	24.32	71.4
Mar. 1.5	52.71 3	11.8 12	51.26 4	59.5 7	44.82 2	41.7 28	24.36 4	72.9 15
11.4	52.70 1	12.7 9	51.25 1	60.3 8	44.69 13	44.5 28	24.35 1	74.5 16
21.4	52.65 5	13.4 7	51.20 5	61.2 9	44.42 27	47.1 26	24.29 6	76.2 17
31.4	52.57 8	13.8 4	51.11 9	62.2 10	44.03 39	49.4 23	24.18 11	77.8 16
	10	2	11	9	48	19	14	14
Apr. 10.4	52.47	14.0	51.00	63.1	43.55	51.3	24.04	79.2
20.3	52.35 12	14.0 0	50.87 13	64.0 9	43.00 55	52.8 15	23.87 17	80.4 12
30.3	52.23 12	13.9 1	50.73 14	64.8 8	42.41 59	53.8 10	23.69 18	81.4 10
May 10.3	52.11 12	13.6 3	50.59 14	65.4 6	41.80 61	54.3 5	23.51 18	82.1 7
20.2	51.99 12	13.1 5	50.45 14	65.9 5	41.20 60	54.3 0	23.33 18	82.5 4
	11	6	12	3	57	5	16	1
30.2	51.88	12.5	50.33	66.2	40.63	53.8	23.17	82.6
June 9.2	51.79 9	11.8 7	50.23 10	66.3 1	40.10 53	52.7 11	23.03 14	82.4 2
19.2	51.72 7	11.1 7	50.15 8	66.2 1	39.64 46	51.2 15	22.92 11	81.9 5
29.1	51.67 5	10.3 8	50.09 6	66.0 2	39.26 38	49.2 20	22.83 9	81.1 8
July 9.1	51.64 3	9.4 9	50.06 3	65.6 4	38.97 29	46.8 24	22.77 6	80.0 11
	1	9	0	6	19	27	2	13
19.1	51.63	8.5	50.06	65.0	38.78	44.1	22.75	78.7
29.1	51.65 2	7.6 9	50.09 3	64.2 8	38.69 9	41.2 29	22.76 1	77.1 16
Aug. 8.0	51.69 4	6.8 8	50.14 5	63.3 9	38.70 1	38.0 32	22.81 5	75.3 18
18.0	51.76 7	6.1 7	50.22 8	62.2 11	38.82 12	34.7 33	22.90 9	73.4 19
28.0	51.86 10	5.5 6	50.33 11	61.0 12	39.05 23	31.4 33	23.03 13	71.4 20
	13	3	15	14	34	34	16	22
Sept. 6.9	51.99	5.2	50.48	59.6	39.39	28.0	23.19	69.2
16.9	52.15 16	5.1 1	50.66 18	58.1 15	39.83 44	24.7 33	23.39 20	66.9 23
26.9	52.34 19	5.2 1	50.87 21	56.5 16	40.37 54	21.5 32	23.63 24	64.6 23
Oct. 6.9	52.56 22	5.6 4	51.12 25	54.7 18	41.00 63	18.5 30	23.91 28	62.2 24
16.8	52.81 25	6.4 8	51.40 28	52.8 19	41.72 72	15.7 28	24.22 31	59.9 23
	28	11	30	19	80	25	35	23
26.8	53.09	7.5	51.70	50.9	42.52	13.2	24.57	57.6
Nov. 5.8	53.39 30	8.9 14	52.03 33	49.0 19	43.38 86	11.1 21	24.95 38	55.5 21
15.8	53.71 32	10.6 17	52.38 35	47.1 19	44.29 91	9.5 16	25.36 41	53.6 19
25.7	54.04 33	12.5 19	52.75 37	45.3 18	45.23 94	8.4 11	25.78 42	51.9 17
Dec. 5.7	54.38 34	14.5 20	53.12 37	43.6 17	46.17 94	7.8 6	26.20 42	50.5 14
	33	22	36	14	92	0	42	10
15.7	54.71	16.7	53.48	42.2	47.09	7.8	26.62	49.5
25.6	55.02 31	19.0 23	53.83 35	41.0 12	47.96 87	8.3 5	27.02 40	48.9 6
35.6	55.30 28	21.2 22	54.15 32	40.1 9	48.75 79	9.4 11	27.39 37	48.7 2
See δ , Tan δ	1.002	-0.067	1.117	+0.497	3.478	+3.331	1.335	+0.884
Mean Place	51 ^s .038	6'''.43	49 ^s .087	61'''.96	37 ^s .874	37'''.77	21 ^s .658	73'''.82
$D^* \alpha$, $D_* \alpha$	0.00	0.00	+0.01	+0.03	+0.05	+0.19	+0.01	+0.05
$D^* \delta$, $D_* \delta$	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5



FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϕ Argus. Mag. 3.7		π Leonis. Mag. 4.9		η Leonis. Mag. 3.6		α Leonis. Mag. 1.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 9 53 s	° ' " -54 8 "	h m 9 55 s	° ' " + 8 27 "	h m 10 2 s	° ' " +17 10 "	h m 10 3 s	° ' " +12 23 "
Jan. 0.6	49.14	56.0	37.89	44.7	36.34	73.1	45.29	34.0
10.6	49.46 32	59.5 35	38.17 28	43.1 16	36.63 29	71.9 12	45.58 29	32.5 15
20.6	49.72 26	63.1 36	38.40 23	41.7 14	36.88 25	71.0 9	45.83 25	31.3 12
30.6	49.91 19	66.8 37	38.59 19	40.6 11	37.09 21	70.3 7	46.03 20	30.4 9
Feb. 9.5	50.03 12	70.6 38	38.73 14	39.7 9	37.25 16	69.9 4	46.18 15	29.7 7
	5	37	9	7	10	1	10	4
19.5	50.08	74.3	38.82	39.0	37.35	69.8	46.28	29.3
Mar. 1.5	50.05 3	77.8 35	38.86 4	38.6 4	37.40 5	69.9 1	46.33 5	29.1 2
11.4	49.96 9	81.1 33	38.86 0	38.4 2	37.41 1	70.2 3	46.34 1	29.1 0
21.4	49.82 14	84.0 29	38.82 4	38.4 0	37.37 4	70.7 5	46.31 3	29.3 2
31.4	49.63 19	86.6 26	38.75 7	38.6 2	37.30 7	71.3 6	46.24 7	29.7 4
	23	22	9	3	10	7	9	5
Apr. 10.4	49.40	88.8	38.66	38.9	37.20	72.0	46.15	30.2
20.3	49.14 26	90.5 17	38.55 11	39.3 4	37.09 11	72.7 7	46.04 11	30.7 5
30.3	48.86 28	91.8 13	38.43 12	39.7 4	36.97 12	73.3 6	45.92 12	31.2 5
May 10.3	48.58 28	92.6 8	38.31 12	40.2 5	36.85 12	73.9 6	45.80 12	31.8 6
20.3	48.30 28	92.9 3	38.20 11	40.7 5	36.73 12	74.4 5	45.68 12	32.3 5
	28	2	11	5	11	5	11	5
30.2	48.02	92.7	38.09	41.2	36.62	74.9	45.57	32.8
June 9.2	47.76 26	92.0 7	38.00 9	41.7 5	36.52 10	75.3 4	45.48 9	33.3 5
19.2	47.52 24	90.8 12	37.93 7	42.2 5	36.44 8	75.6 3	45.41 7	33.7 4
29.1	47.30 22	89.2 16	37.87 6	42.6 4	36.38 6	75.7 1	45.35 6	34.0 3
July 9.1	47.12 18	87.3 19	37.84 3	43.0 4	36.35 3	75.7 0	45.31 4	34.2 2
	14	23	1	3	1	1	2	1
19.1	46.98	85.0	37.83	43.3	36.34	75.6	45.29	34.3
29.1	46.89 9	82.5 25	37.85 2	43.5 2	36.35 1	75.3 3	45.30 1	34.3 0
Aug. 8.0	46.84 5	79.8 27	37.89 4	43.6 1	36.39 4	74.9 4	45.34 4	34.2 1
18.0	46.85 1	77.0 28	37.96 7	43.6 0	36.45 6	74.4 5	45.40 6	33.9 3
28.0	46.92 7	74.2 28	38.06 10	43.4 2	36.54 9	73.7 7	45.49 9	33.4 5
	13	26	12	4	12	9	12	6
Sept. 7.0	47.05	71.6	38.18	43.0	36.66	72.8	45.61	32.8
16.9	47.23 18	69.2 24	38.33 15	42.4 6	36.82 16	71.7 11	45.76 15	32.0 8
26.9	47.48 25	67.1 21	38.52 19	41.6 8	37.01 19	70.4 13	45.94 18	31.0 10
Oct. 6.9	47.79 31	65.5 16	38.74 22	40.6 10	37.23 22	69.0 14	46.15 21	29.8 12
16.8	48.15 36	64.4 11	38.99 25	39.4 12	37.48 25	67.4 16	46.40 25	28.4 14
	40	6	28	15	28	18	28	16
26.8	48.55	63.8	39.27	37.9	37.76	65.6	46.68	26.8
Nov. 5.8	48.99 44	63.8 0	39.57 30	36.2 17	38.07 31	63.7 19	46.98 30	25.0 18
15.8	49.45 46	64.5 7	39.90 33	34.4 18	38.40 33	61.8 19	47.30 32	23.1 19
25.7	49.92 47	65.8 13	40.24 34	32.5 19	38.75 35	59.9 19	47.64 34	21.1 20
Dec. 5.7	50.39 47	67.7 19	40.58 34	30.5 20	39.10 35	58.0 19	47.99 35	19.2 19
	45	25	33	19	35	18	34	19
15.7	50.84	70.2	40.91	28.6	39.45	56.2	48.33	17.3
25.7	51.25 41	73.1 29	41.23 32	26.7 19	39.78 33	54.6 16	48.66 33	15.5 18
35.6	51.61 36	76.3 32	41.53 30	24.9 18	40.09 31	53.2 14	48.96 30	13.9 16
Sec δ , Tan δ	1.708	-1.384	1.011	+0.149	1.047	+0.309	1.024	+0.220
Mean Place	48°.353	72''.68	37°.031	43''.48	35°.406	74''.47	44°.428	34''.10
D' ψ α , D ω α	-0.02	-0.08	0.00	+0.01	0.00	+0.02	0.00	+0.01
D' ψ δ , D ω δ	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5	-0.3	+0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Hydræ. Mag. 3.8		η Velorum. Mag. 4.1		β Ursæ Majoris. Mag. 5.7		ζ Leonis. Mag. 3.6	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 10 6 s	° ' -11 55 "	h m 10 11 s	° ' -41 41 "	h m 10 11 s	° ' +65 32 "	h m 10 11 s	° ' +23 50 "
Jan. 0.6	21.45	18.4	5.39	11.8	46.78	23.3	52.26	61.1
10.6	21.73 ²⁸	20.9 ²⁵	5.70 ³¹	15.0 ³²	47.35 ⁵⁷	24.2 ⁹	52.57 ³¹	60.1 ¹⁰
20.6	21.96 ²³	23.4 ²⁵	5.96 ²⁶	18.4 ³⁴	47.85 ⁵⁰	25.6 ¹⁴	52.84 ²⁷	59.5 ⁶
30.6	22.15 ¹⁹	25.7 ²³	6.16 ²⁰	21.9 ³⁵	48.26 ⁴¹	27.5 ¹⁹	53.06 ²²	59.2 ³
Feb. 9.5	22.29 ¹⁴	27.8 ²¹	6.30 ¹⁴	25.3 ³⁴	48.56 ³⁰	29.7 ²²	53.23 ¹⁷	59.2 ⁰
	9	19	8	33	19	24	12	3
19.5	22.38	29.7	6.38	28.6	48.75	32.1	53.35	59.5
Mar. 1.5	22.42 ⁴	31.3 ¹⁶	6.41 ³	31.7 ³¹	48.83 ⁸	34.7 ²⁶	53.42 ⁷	60.0 ⁵
11.5	22.42 ⁰	32.7 ¹⁴	6.38 ³	34.6 ²⁹	48.80 ³	37.3 ²⁶	53.43 ¹	60.7 ⁷
21.4	22.39 ³	33.8 ¹¹	6.31 ⁷	37.2 ²⁶	48.67 ¹³	39.8 ²⁵	53.40 ³	61.5 ⁸
31.4	22.32 ⁷	34.7 ⁹	6.20 ¹¹	39.5 ²³	48.46 ²¹	42.1 ²³	53.33 ⁷	62.4 ⁹
	9	6	15	19	28	21	9	10
Apr. 10.4	22.23	35.3	6.05	41.4	48.18	44.2	53.24	63.4
20.3	22.12 ¹¹	35.7 ⁴	5.88 ¹⁷	42.9 ¹⁵	47.85 ³³	45.9 ¹⁷	53.13 ¹¹	64.3 ⁹
30.3	22.00 ¹²	35.8 ¹	5.70 ¹⁸	44.0 ¹¹	47.48 ³⁷	47.2 ¹³	53.01 ¹²	65.2 ⁹
May 10.3	21.88 ¹²	35.7 ¹	5.51 ¹⁹	44.7 ⁷	47.09 ³⁹	48.1 ⁹	52.88 ¹³	65.9 ⁷
20.3	21.76 ¹²	35.4 ³	5.32 ¹⁹	44.9 ²	46.70 ³⁹	48.4 ³	52.75 ¹³	66.5 ⁶
	12	5	19	2	38	2	12	4
30.2	21.64	34.9	5.13	44.7	46.32	48.2	52.63	66.9
June 9.2	21.54 ¹⁰	34.2 ⁷	4.95 ¹⁸	44.1 ⁶	45.97 ³⁵	47.6 ⁶	52.53 ¹⁰	67.2 ³
19.2	21.45 ⁹	33.4 ⁸	4.78 ¹⁷	43.1 ¹⁰	45.66 ³¹	46.5 ¹¹	52.44 ⁹	67.3 ¹
29.2	21.38 ⁷	32.4 ¹⁰	4.64 ¹⁴	41.7 ¹⁴	45.39 ²⁷	45.0 ¹⁵	52.37 ⁷	67.2 ¹
July 9.1	21.33 ⁵	31.3 ¹¹	4.52 ¹²	40.0 ¹⁷	45.18 ²¹	43.1 ¹⁹	52.32 ⁵	67.0 ²
	3	12	10	20	15	23	2	4
19.1	21.30	30.1	4.42	38.0	45.03	40.8	52.30	66.6
29.1	21.30 ⁰	28.9 ¹²	4.36 ⁶	35.8 ²²	44.95 ⁸	38.2 ²⁶	52.30 ⁰	66.0 ⁶
Aug. 8.0	21.32 ²	27.7 ¹²	4.33 ³	33.5 ²³	44.93 ²	35.4 ²⁸	52.33 ³	65.2 ⁸
18.0	21.37 ⁵	26.6 ¹¹	4.34 ¹	31.1 ²⁴	44.98 ⁵	32.3 ³¹	52.39 ⁶	64.2 ¹⁰
28.0	21.44 ⁷	25.7 ⁹	4.40 ⁶	28.7 ²⁴	45.10 ¹²	29.1 ³²	52.47 ⁸	63.1 ¹¹
	11	8	10	22	20	32	12	13
Sept. 7.0	21.55	24.9	4.50	26.5	45.30	25.9	52.59	61.8
16.9	21.69 ¹⁴	24.3 ⁶	4.64 ¹⁴	24.5 ²⁰	45.57 ²⁷	22.6 ³³	52.74 ¹⁵	60.3 ¹⁵
26.9	21.86 ¹⁷	24.0 ³	4.83 ¹⁹	22.8 ¹⁷	45.92 ³⁵	19.4 ³²	52.92 ¹⁸	58.7 ¹⁶
Oct. 6.9	22.07 ²¹	24.1 ¹	5.07 ²⁴	21.5 ¹³	46.33 ⁴¹	16.3 ³¹	53.14 ²²	56.9 ¹⁸
16.9	22.31 ²⁴	24.5 ⁴	5.35 ²⁸	20.7 ⁸	46.81 ⁴⁸	13.3 ³⁰	53.39 ²⁵	55.0 ¹⁹
	27	8	33	3	54	27	29	20
26.8	22.58	25.3	5.68	20.4	47.35	10.6	53.68	53.0
Nov. 5.8	22.88 ³⁰	26.5 ¹²	6.04 ³⁶	20.6 ²	47.95 ⁶⁰	8.3 ²³	54.00 ³²	51.0 ²⁰
15.8	23.20 ³²	28.0 ¹⁵	6.42 ³⁸	21.4 ⁸	48.59 ⁶⁴	6.3 ²⁰	54.34 ³⁴	49.0 ²⁰
25.7	23.53 ³³	29.8 ¹⁸	6.82 ⁴⁰	22.7 ¹³	49.26 ⁶⁷	4.7 ¹⁶	54.70 ³⁶	47.0 ²⁰
Dec. 5.7	23.87 ³⁴	31.9 ²¹	7.22 ⁴⁰	24.6 ¹⁹	49.94 ⁶⁸	3.6 ¹¹	55.06 ³⁶	45.1 ¹⁹
	33	23	39	24	68	5	36	17
15.7	24.20	34.2	7.61	27.0	50.62	3.1	55.42	43.4
25.7	24.52 ³²	36.6 ²⁴	7.98 ³⁷	29.8 ²⁸	51.27 ⁶⁵	3.1 ⁰	55.77 ³⁵	42.0 ¹⁴
35.6	24.82 ³⁰	39.1 ²⁵	8.31 ³³	32.9 ³¹	51.88 ⁶¹	3.7 ⁶	56.10 ³³	40.8 ¹²
Sec δ , Tan δ	1.022	-0.211	1.339	-0.891	2.415	+2.198	1.093	+0.442
Mean Place	20 ^s .805	25 ^{''} .00	4 ^s .835	26 ^{''} .10	43 ^s .864	34 ^{''} .32	51 ^s .269	64 ^{''} .61
D ['] ϕ α , D ₀ α	0.00	-0.01	-0.01	-0.05	+0.03	+0.13	+0.01	+0.03
D ['] ϕ δ , D ₀ δ	-0.3	+0.5	-0.4	+0.5	-0.4	+0.5	-0.4	+0.5

[Eph 13]

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	9 H. Draconis. Mag. 5.0			ρ Leonis. Mag. 3.8			33 Sextantis. Mag. 6.4			41 Leonis Minoris. Mag. 5.0		
	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.
	h m	° '		h m	° '		h m	° '		h m	° '	
	10 27	+76 9		10 28	+ 9 44		10 36	- 1 16		10 38	+23 38	
	s	"		s	"		s	"		s	"	
Jan. 0.7	49.02	28.8		14.63	76.4		59.20	58.8		42.17	34.2	
10.6	49.96 94	29.9 11		14.93 30	74.7 17		59.49 29	60.9 21		42.49 32	33.1 11	
20.6	50.79 83	31.5 16		15.19 26	73.3 14		59.75 26	62.9 20		42.78 29	32.3 8	
30.6	51.47 68	33.6 21		15.41 22	72.1 12		59.97 22	64.7 18		43.02 24	31.8 5	
Feb. 9.6	51.99 52	36.1 25		15.58 17	71.2 9		60.15 18	66.3 16		43.22 20	31.7 1	
	33	27		13	6		13	13		15	2	
19.5	52.32	38.8		15.71	70.6		60.28	67.6		43.37	31.9	
Mar. 1.5	52.47 15	41.7 29		15.79 8	70.2 4		60.36 8	68.7 11		43.46 9	32.4 5	
11.5	52.44 3	44.6 29		15.82 3	70.0 2		60.39 3	69.5 8		43.50 4	33.1 7	
21.4	52.24 20	47.4 28		15.81 1	70.1 1		60.39 0	70.1 6		43.50 0	33.9 8	
31.4	51.88 36	50.0 26		15.77 4	70.4 3		60.36 3	70.4 3		43.46 4	34.9 10	
	49	23		7	4		6	1		7	10	
Apr. 10.4	51.39	52.3		15.70	70.8		60.30	70.5		43.39	35.9	
20.4	50.79 60	54.2 19		15.61 9	71.2 4		60.21 9	70.5 0		43.29 10	36.9 10	
30.3	50.11 68	55.7 15		15.50 11	71.7 5		60.11 10	70.3 2		43.18 11	37.9 10	
May 10.3	49.38 73	56.7 10		15.39 11	72.3 6		60.01 10	70.0 3		43.06 12	38.8 9	
20.3	48.63 75	57.1 4		15.28 11	72.9 6		59.90 11	69.6 4		42.94 12	39.5 7	
	74	2		10	5		10	5		12	6	
30.3	47.89	56.9		15.18	73.4		59.80	69.1		42.82	40.1	
June 9.2	47.18 71	56.2 7		15.08 10	73.9 5		59.70 10	68.6 5		42.71 11	40.5 4	
19.2	46.53 65	55.0 12		14.99 9	74.4 5		59.61 9	68.0 6		42.61 10	40.7 2	
29.2	45.95 58	53.3 17		14.92 7	74.8 4		59.54 7	67.3 7		42.53 8	40.8 1	
July 9.1	45.46 49	51.2 21		14.87 5	75.1 3		59.48 6	66.6 7		42.46 7	40.6 2	
	39	26		3	3		4	7		5	4	
19.1	45.07	48.6		14.84	75.4		59.44	65.9		42.41	40.2	
29.1	44.80 27	45.7 29		14.83 1	75.5 1		59.42 2	65.3 6		42.39 2	39.7 5	
Aug. 8.1	44.64 16	42.6 31		14.84 1	75.5 0		59.42 0	64.7 6		42.39 0	39.0 7	
18.0	44.60 4	39.2 34		14.88 4	75.3 2		59.44 2	64.2 5		42.42 3	38.0 10	
28.0	44.69 9	35.7 35		14.94 6	75.0 3		59.49 5	63.9 3		42.48 6	36.8 12	
	22	36		9	5		8	1		9	13	
Sept. 7.0	44.91	32.1		15.03	74.5		59.57	63.8		42.57	35.5	
17.0	45.27 36	28.5 36		15.16 13	73.8 7		59.68 11	63.9 1		42.69 12	34.0 15	
26.9	45.75 48	25.0 35		15.32 16	72.9 9		59.83 15	64.2 3		42.84 15	32.3 17	
Oct. 6.9	46.35 60	21.6 34		15.51 19	71.7 12		60.01 18	64.8 6		43.03 19	30.4 19	
16.9	47.07 72	18.4 32		15.73 22	70.3 14		60.23 22	65.6 8		43.26 23	28.4 20	
	83	29		26	16		25	12		26	21	
26.8	47.90	15.5		15.99	68.7		60.48	66.8		43.52	26.3	
Nov. 5.8	48.83 93	13.0 25		16.28 29	67.0 17		60.76 28	68.3 15		43.82 30	24.1 22	
15.8	49.83 100	10.9 21		16.60 32	65.1 19		61.06 30	70.0 17		44.15 33	21.9 22	
25.8	50.89 106	9.3 16		16.93 33	63.0 21		61.39 33	71.9 19		44.50 35	19.7 22	
Dec. 5.7	51.98 109	8.2 11		17.27 34	60.9 21		61.73 34	74.0 21		44.86 36	17.7 20	
	109	5		34	20		34	22		36	19	
15.7	53.07	7.7		17.61	58.9		62.07	76.2		45.22	15.8	
25.7	54.13 106	7.8 1		17.95 34	57.0 19		62 40 33	78.4 22		45.58 36	14.2 16	
35.7	55.13 100	8.6 8		18.27 32	55.2 18		62.71 31	80.6 22		45.92 34	12.8 14	
Sec δ, Tan δ	4.180	+4.059		1.015	+0.172		1.000	-0.022		1.092	+0.438	
Mean Place	44°.011	41''.87		13°.912	76''.80		58°.629	61''.36		41°.307	39''.08	
D'ψ a, Dω a	+0.04	+0.25		0.00	+0.01		0.00	0.00		0.00	+0.03	
Dψ δ, Dω δ	-0.4	+0.4		-0.4	+0.4		-0.4	+0.4		-0.4	..+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Argūs. Mag. 3.0		42 Leonis Minoris. Mag. 5.4		η Argūs. Var. 1.6-6.6		μ Argūs. Mag. 2.8	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 10 39 s	° ' - 63 56 "	h m 10 41 s	° ' + 31 7 "	h m 10 41 s	° ' - 59 13 "	h m 10 43 s	° ' - 48 57 "
Jan. 0.7	51.33	1.4	2.83	80.1	41.27	18.9	1.76	21.9
10.6	51.80 47	4.5 31	3.17 34	79.2 9	41.69 42	22.0 31	2.13 37	25.0 31
20.6	52.20 40	7.9 34	3.48 31	78.7 5	42.06 37	25.4 34	2.44 31	28.3 33
30.6	52.52 32	11.6 37	3.74 26	78.7 0	42.36 30	29.1 37	2.70 26	31.8 35
Feb. 9.6	52.75 23 14	15.5 39 39	3.95 21 15	79.0 3 6	42.58 22 14	32.9 38 38	2.90 20 13	35.4 36 36
19.5	52.89 6	19.4 38	4.10 10	79.6 9	42.72 6	36.7 37	3.03 7	39.0 35
Mar. 1.5	52.95 3	23.2 37	4.20 5	80.5 11	42.78 1	40.4 36	3.10 1	42.5 33
11.5	52.92 11	26.9 35	4.25 0	81.6 13	42.77 8	44.0 34	3.11 4	45.8 30
21.4	52.81 18	30.4 32	4.25 5	82.9 13	42.69 14	47.4 31	3.07 9	48.8 28
31.4	52.63 24	33.6 29	4.20 8	84.2 14	42.55 19	50.5 27	2.98 13	51.6 24
Apr. 10.4	52.39 29	36.5 25	4.12 10	85.6 13	42.36 23	53.2 24	2.85 16	54.0 20
20.4	52.10 32	39.0 20	4.02 12	86.9 11	42.13 27	55.6 19	2.69 18	56.0 16
30.3	51.78 36	41.0 16	3.90 14	88.0 10	41.86 29	57.5 15	2.51 21	57.6 12
May 10.3	51.42 38	42.6 11	3.76 14	89.0 8	41.57 31	59.0 10	2.30 22	58.8 7
20.3	51.04 38	43.7 6	3.62 13	89.8 6	41.26 32	60.0 5	2.08 22	59.5 3
30.3	50.66 38	44.3 0	3.49 12	90.4 3	40.94 31	60.5 1	1.86 21	59.8 2
June 9.2	50.28 38	44.3 5	3.37 11	90.7 1	40.63 30	60.4 5	1.65 21	59.6 6
19.2	49.90 36	43.8 10	3.26 10	90.8 2	40.33 29	59.9 10	1.44 20	59.0 11
29.2	49.54 33	42.8 14	3.16 8	90.6 4	40.04 26	58.9 14	1.24 18	57.9 14
July 9.1	49.21 28	41.4 19	3.08 5	90.2 7	39.78 23	57.5 19	1.06 15	56.5 18
19.1	48.93 23	39.5 22	3.03 3	89.5 9	39.55 19	55.6 22	0.91 12	54.7 21
29.1	48.70 18	37.3 25	3.00 0	88.6 11	39.36 14	53.4 25	0.79 8	52.6 23
Aug. 8.1	48.52 11	34.8 27	3.00 2	87.5 14	39.22 8	50.9 27	0.71 4	50.3 25
18.0	48.41 4	32.1 29	3.02 5	86.1 16	39.14 2	48.2 27	0.67 0	47.8 25
28.0	48.37 5	29.2 29	3.07 9	84.5 18	39.12 5	45.5 28	0.67 5	45.3 25
Sept. 7.0	48.42 13	26.3 28	3.16 12	82.7 19	39.17 12	42.7 27	0.72 11	42.8 23
17.0	48.55 22	23.5 26	3.28 16	80.8 21	39.29 20	40.0 24	0.83 17	40.5 21
26.9	48.77 31	20.9 22	3.44 20	78.7 22	39.49 27	37.6 21	1.00 23	38.4 18
Oct. 6.9	49.08 39	18.7 18	3.64 24	76.5 23	39.76 34	35.5 17	1.23 28	36.6 13
16.9	49.47 46	16.9 13	3.88 28	74.2 24	40.10 40	33.8 12	1.51 33	35.3 8
26.8	49.93 52	15.6 7	4.16 31	71.8 24	40.50 46	32.6 6	1.84 37	34.5 3
Nov. 5.8	50.45 57	14.9 1	4.47 34	69.4 23	40.96 50	32.0 0	2.21 41	34.2 3
15.8	51.02 60	14.8 5	4.81 36	67.1 22	41.46 53	32.0 6	2.62 44	34.5 9
25.8	51.62 60	15.3 12	5.17 38	64.9 20	41.99 54	32.6 13	3.06 45	35.4 14
Dec. 5.7	52.22 59	16.5 18	5.55 38	62.9 18	42.53 53	33.9 19	3.51 44	36.8 20
15.7	52.81 57	18.3 23	5.93 38	61.1 14	43.06 50	35.8 24	3.95 42	38.8 25
25.7	53.38 52	20.6 29	6.31 36	59.7 11	43.56 46	38.2 29	4.37 40	41.3 29
35.7	53.90	23.5	6.67	58.6	44.02	41.1	4.77	44.2
Sec δ, Tan δ	2.276	-2.045	1.168	+0.604	1.955	-1.679	1.523	-1.149
Mean Place	50°.959	20''.26	1°.843	86''.98	40°.951	36''.99	1°.464	37''.90
D'φ a, D _m a	-0.02	-0.13	+0.01	+0.04	-0.01	-0.11	-0.01	-0.07
D'φ δ, D _m δ	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Leonis. Mag. 5.3		♎ Chamæleon. Mag. 4.6		♏ Hydræ. Mag. 3.3		♐ Leonis Minoris. Mag. 3.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 10 44 s	° ' +10 59 "	h m 10 44 s	° ' -80 4 "	h m 10 45 s	° ' -15 44 "	h m 10 48 s	° ' +34 40 "
Jan. 0.7	41.81	79.2	59.29	31.8	20.27	9.7	28.04	54.9
10.6	42.12 31	77.5 17	60.32 103	34.7 29	20.57 30	12.2 25	28.40 36	54.1 8
20.6	42.40 28	76.1 14	61.19 87	38.0 33	20.84 27	14.8 26	28.72 32	53.8 3
30.6	42.63 23	75.0 11	61.87 68	41.6 36	21.07 23	17.3 25	29.00 28	53.9 1
Feb. 9.6	42.82 19	74.1 9	62.34 47	45.4 38	21.25 18	19.6 23	29.22 22	54.3 4
	14	6	25	39	13	21	17	8
19.5	42.96	73.5	62.59	49.3	21.38	21.7	29.39	55.1
Mar. 1.5	43.06 10	73.2 3	62.63 4	53.3 40	21.46 8	23.6 19	29.50 11	56.2 11
11.5	43.11 5	73.1 1	62.47 16	57.2 39	21.50 4	25.3 17	29.56 6	57.5 13
21.5	43.12 1	73.2 1	62.12 35	61.0 38	21.50 0	26.7 14	29.56 0	59.0 15
31.4	43.09 3	73.5 3	61.59 53	64.6 36	21.47 3	27.9 12	29.52 4	60.5 15
	6	5	69	33	6	9	8	15
Apr. 10.4	43.03	74.0	60.90	67.9	21.41	28.8	29.44	62.0
20.4	42.95 8	74.6 6	60.07 83	70.8 29	21.33 8	29.4 6	29.34 10	63.4 14
30.3	42.85 10	75.2 6	59.12 95	73.3 25	21.23 10	29.8 4	29.21 13	64.7 13
May 10.3	42.75 10	75.8 6	58.08 104	75.4 21	21.12 11	29.9 1	29.07 14	65.8 11
20.3	42.64 11	76.4 6	56.98 110	76.9 15	21.01 11	29.8 1	28.92 15	66.7 9
	10	6	115	10	11	3	14	6
30.3	42.54	77.0	55.83	77.9	20.90	29.5	28.78	67.3
June 9.2	42.44 10	77.5 5	54.67 116	78.3 4	20.79 11	29.0 5	28.65 13	67.6 3
19.2	42.35 9	78.0 5	53.52 115	78.2 1	20.69 10	28.3 7	28.53 12	67.6 0
29.2	42.27 8	78.4 4	52.41 111	77.6 6	20.60 9	27.4 9	28.42 11	67.4 2
July 9.2	42.21 6	78.7 3	51.38 103	76.4 12	20.53 7	26.3 11	28.33 9	66.9 5
	4	2	92	17	6	11	7	8
19.1	42.17	78.9	50.46	74.7	20.47	25.2	28.26	66.1
29.1	42.14 3	78.9 0	49.67 79	72.6 21	20.43 4	24.0 12	28.22 4	65.0 11
Aug. 8.1	42.14 0	78.8 1	49.04 63	70.1 25	20.41 2	22.7 13	28.21 1	63.7 13
18.0	42.16 2	78.5 3	48.59 45	67.4 27	20.42 1	21.5 12	28.22 1	62.1 16
28.0	42.21 5	78.1 4	48.34 25	64.5 29	20.46 4	20.4 11	28.26 4	60.3 18
	8	6	3	30	7	10	8	20
Sept. 7.0	42.29	77.5	48.31	61.5	20.53	19.4	28.34	58.3
17.0	42.40 11	76.7 8	48.51 20	58.5 30	20.63 10	18.6 8	28.46 12	56.2 21
26.9	42.54 14	75.7 10	48.94 43	55.6 29	20.77 14	18.1 5	28.62 16	53.9 23
Oct. 6.9	42.71 17	74.5 12	49.59 65	53.0 26	20.95 18	17.9 2	28.82 20	51.5 24
16.9	42.92 21	73.0 15	50.45 86	50.8 22	21.16 21	18.1 2	29.06 24	49.0 25
	25	17	103	18	25	5	27	25
26.9	43.17	71.3	51.48	49.0	21.41	18.6	29.33	46.5
Nov. 5.8	43.45 28	69.5 18	52.66 118	47.8 12	21.69 28	19.5 9	29.64 31	44.0 25
15.8	43.76 31	67.5 20	53.95 129	47.2 6	22.00 31	20.8 13	29.99 35	41.6 24
25.8	44.09 33	65.4 21	55.30 135	47.3 1	22.33 33	22.5 17	30.36 37	39.3 23
Dec. 5.7	44.43 34	63.3 21	56.67 137	48.1 8	22.67 34	24.5 20	30.75 39	37.2 21
	35	21	134	14	35	22	40	17
15.7	44.78	61.2	58.01	49.5	23.02	26.7	31.15	35.5
25.7	45.12 34	59.2 20	59.27 126	51.5 20	23.36 34	29.1 24	31.54 39	34.1 14
35.7	45.44 32	57.4 18	60.40 113	54.0 25	23.68 32	31.6 25	31.91 37	33.1 10
Sec δ, Tan δ	1.019	+0.194	5.806	-5.719	1.039	-0.282	1.216	+0.692
Mean Place	41°.160	80''.70	58°.640	52''.70	19°.858	16''.54	27°.019	63''.16
D'ψ α, Dω α	0.00	+0.01	-0.05	-0.36	0.00	-0.02	+0.01	+0.04
Dψ δ, Dω δ	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	54 Leonis. Mag. 4.5		1 Antliae. Mag. 4.7		Groombridge 1706. Mag. 6.3		α Crateris. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 10 50 s	° ' +25 12 "	h m 10 52 s	° ' -36 39 "	h m 10 53 s	° ' +78 13 "	h m 10 55 s	° ' -17 50 "
Jan. 0.7	55.13	44.7	40.18	58.7	7.09	56.4	32.39	0.4
10.6	55.46 33	43.5 12	40.51 33	61.7 30	8.23 114	57.2 8	32.70 31	3.0 26
20.6	55.76 30	42.7 8	40.80 29	64.8 31	9.25 102	58.6 14	32.98 28	5.6 26
30.6	56.02 26	42.3 4	41.05 25	68.0 32	10.11 86	60.5 19	33.22 24	8.1 25
Feb. 9.6	56.23 21 16	42.2 1 2	41.25 20 14	71.2 32 31	10.80 69 49	62.8 23 27	33.41 19 14	10.5 24 23
19.5	56.39	42.4	41.39	74.3	11.29	65.5	33.55	12.8
Mar. 1.5	56.50 11	42.9 5	41.48 9	77.3 30	11.57 28	68.4 29	33.64 9	14.9 21
11.5	56.55 5	43.7 8	41.52 4	80.1 28	11.63 6	71.4 30	33.69 5	16.7 18
21.5	56.56 1	44.7 10	41.51 1	82.6 25	11.48 15	74.3 29	33.70 1	18.3 16
31.4	56.53 3 6	45.8 11 11	41.46 5 8	84.9 23 20	11.15 33 50	77.1 28 25	33.67 3 5	19.6 13 10
Apr. 10.4	56.47	46.9	41.38	86.9	10.65	79.6	33.62	20.6
20.4	56.38 9	48.0 11	41.27 11	88.5 16	10.00 65	81.8 22	33.54 8	21.3 7
30.3	56.27 11	49.1 11	41.14 13	89.7 12	9.24 76	83.5 17	33.44 10	21.8 5
May 10.3	56.15 12	50.1 10	41.00 14	90.6 9	8.40 84	84.7 12	33.34 10	22.1 3
20.3	56.03 12 12	50.9 8 6	40.85 15 15	91.1 5 1	7.52 88 89	85.4 7 2	33.23 11 11	22.1 0 3
30.3	55.91	51.5	40.70	91.2	6.63	85.6	33.12	21.8
June 9.2	55.80 11	51.9 4	40.55 15	90.9 3	5.75 88	85.2 4	33.01 11	21.3 5
19.2	55.70 10	52.2 3	40.40 15	90.3 6	4.91 84	84.2 10	32.90 11	20.6 7
29.2	55.61 9	52.3 1	40.26 14	89.3 10	4.14 77	82.7 15	32.80 10	19.7 9
July 9.2	55.53 8 6	52.1 2 4	40.13 13 11	88.0 13 16	3.46 68 57	80.8 19 24	32.72 8 6	18.7 10 11
19.1	55.47	51.7	40.02	86.4	2.89	78.4	32.66	17.6
29.1	55.44 3	51.1 6	39.94 8	84.6 18	2.44 45	75.6 28	32.61 5	16.4 12
Aug. 8.1	55.43 1	50.3 8	39.89 5	82.6 20	2.11 33	72.5 31	32.58 3	15.1 13
18.0	55.45 2	49.3 10	39.87 2	80.6 20	1.92 19	69.2 33	32.58 0	13.8 13
28.0	55.49 4 7	48.0 13 15	39.88 1 5	78.6 20 20	1.88 4 11	65.6 36 37	32.60 2 5	12.6 12 11
Sept. 7.0	55.56	46.5	39.93	76.6	1.99	61.9	32.65	11.5
17.0	55.67 11	44.9 16	40.02 9	74.7 19	2.25 26	58.2 37	32.74 9	10.6 9
26.9	55.81 14	43.1 18	40.16 14	73.1 16	2.67 42	54.5 37	32.87 13	10.0 6
Oct. 6.9	55.99 18	41.1 20	40.35 19	71.8 13	3.24 57	50.9 36	33.04 17	9.7 3
16.9	56.21 22 26	39.0 21 22	40.58 23 28	70.9 9 4	3.96 72 85	47.5 34 32	33.25 21 24	9.7 0 4
26.9	56.47	36.8	40.86	70.5	4.81	44.3	33.49	10.1
Nov. 5.8	56.76 29	34.5 23	41.18 32	70.6 1	5.79 98	41.5 28	33.77 28	10.9 8
15.8	57.08 32	32.2 23	41.53 35	71.2 6	6.88 109	39.1 24	34.08 31	12.1 12
25.8	57.43 35	29.9 23	41.91 38	72.3 11	8.05 117	37.2 19	34.41 33	13.7 16
Dec. 5.7	57.79 36 37	27.8 21 19	42.30 39 39	73.9 16 21	9.28 123 125	35.8 14 8	34.75 34 35	15.6 19 22
15.7	58.16	25.9	42.69	76.0	10.53	35.0	35.10	17.8
25.7	58.52 36	24.2 17	43.07 38	78.5 25	11.76 123	34.8 2	35.44 34	20.2 24
35.7	58.87 35	22.8 14	43.42 35	81.3 28	12.94 118	35.2 4	35.77 33	22.7 25
Sec δ, Tan δ	1.105	+0.471	1.247	-0.745	4.904	+4.801	1.051	-0.322
Mean Place	54°.306	50''.57	39°.923	71''.58	1°.693	71''.48	32°.054	7''.65
D'φ α, Dα α	0.00	+0.03	-0.01	-0.05	+0.04	+0.31	0.00	-0.02
Dφ δ, Dα δ	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3	-0.4	+0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>d</i> Leonis. Mag. 5.0			<i>β</i> Ursæ Majoris. Mag. 2.4			<i>α</i> Ursæ Majoris. Mag. 2.0			<i>χ</i> Leonis. Mag. 4.7		
	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion N.
	h m	° '		h m	° '		h m	° '		h m	° '	
	10 56	+ 4 4		10 56	+56 50		10 58	+62 12		11 0	+ 7 48	
	s	"		s	"		s	"		s	"	
Jan. 0.7	4.60	65.5		37.81	43.1		24.36	61.2		32.36	22.9	
10.7	4.91 31	63.5 20		38.31 50	43.2 1		24.92 56	61.4 2		32.67 31	21.0 19	
20.6	5.19 28	61.7 18		38.76 45	43.8 6		25.43 51	62.1 7		32.95 28	19.4 16	
30.6	5.43 24	60.2 15		39.15 39	44.9 11		25.87 44	63.4 13		33.19 24	18.0 14	
Feb. 9.6	5.62 19	58.9 13		39.46 31	46.4 15		26.23 36	65.2 18		33.39 20	16.9 11	
	15	10		23	19		27	21		16	8	
19.5	5.77	57.9		39.69	48.3		26.50	67.3		33.55	16.1	
Mar. 1.5	5.87 10	57.1 8		39.84 15	50.5 22		26.67 17	69.7 24		33.66 11	15.6 5	
11.5	5.93 6	56.6 5		39.91 7	52.9 24		26.74 7	72.3 26		33.72 6	15.3 3	
21.5	5.95 2	56.3 3		39.90 1	55.3 24		26.72 2	74.9 26		33.74 2	15.2 1	
31.4	5.93 2	56.3 0		39.83 7	57.7 24		26.62 10	77.4 25		33.73 1	15.4 2	
	5	1		14	23		17	24		4	3	
Apr. 10.4	5.88	56.4		39.69	60.0		26.45	79.8		33.69	15.7	
20.4	5.81 7	56.6 2		39.50 19	62.0 20		26.22 23	81.9 21		33.62 7	16.1 4	
30.4	5.73 8	57.0 4		39.27 23	63.7 17		25.94 28	83.7 18		33.53 9	16.6 5	
May 10.3	5.64 9	57.5 5		39.02 25	65.0 13		25.63 31	85.1 14		33.44 9	17.2 6	
20.3	5.54 10	58.0 5		38.76 26	66.0 10		25.30 33	86.0 9		33.34 10	17.8 6	
	10	5		27	5		33	4		10	6	
30.3	5.44	58.5		38.49	66.5		24.97	86.4		33.24	18.4	
June 9.2	5.34 10	59.1 6		38.23 26	66.5 0		24.65 32	86.4 0		33.14 10	19.0 6	
19.2	5.25 9	59.7 6		37.99 24	66.1 4		24.34 31	85.9 5		33.05 9	19.5 5	
29.2	5.17 8	60.2 5		37.77 22	65.3 8		24.06 28	84.9 10		32.97 8	20.0 5	
July 9.2	5.10 7	60.7 5		37.58 19	64.0 13		23.82 24	83.5 14		32.90 7	20.4 4	
	5	4		16	16		20	18		5	3	
19.1	5.05	61.1		37.42	62.4		23.62	81.7		32.85	20.7	
29.1	5.02 3	61.5 4		37.31 11	60.4 20		23.46 16	79.5 22		32.81 4	20.9 2	
Aug. 8.1	5.01 1	61.8 3		37.24 7	58.0 24		23.35 11	76.9 26		32.79 2	21.0 1	
18.1	5.02 1	62.0 2		37.21 3	55.4 26		23.30 5	74.1 28		32.79 0	20.9 1	
28.0	5.05 3	62.0 0		37.23 2	52.6 28		23.31 1	71.0 31		32.82 3	20.7 2	
	6	2		8	30		7	32		6	4	
Sept. 7.0	5.11	61.8		37.31	49.6		23.38	67.8		32.88	20.3	
17.0	5.21 10	61.4 4		37.44 13	46.4 32		23.52 14	64.5 33		32.97 9	19.7 6	
26.9	5.34 13	60.7 7		37.63 19	43.2 32		23.73 21	61.1 34		33.09 12	18.8 9	
Oct. 6.9	5.50 16	59.8 9		37.88 25	40.0 32		24.01 28	57.7 34		33.25 16	17.7 11	
16.9	5.70 20	58.7 11		38.18 30	36.8 32		24.35 34	54.4 33		33.45 20	16.4 13	
	24	14		36	31		40	31		23	16	
26.9	5.94	57.3		38.54	33.7		24.75	51.3		33.68	14.8	
Nov. 5.8	6.21 27	55.6 17		38.96 42	30.9 28		25.22 47	48.4 29		33.95 27	13.0 18	
15.8	6.51 30	53.8 18		39.42 46	28.3 26		25.75 53	45.8 26		34.25 30	11.1 19	
25.8	6.83 32	51.8 20		39.92 50	26.1 22		26.32 57	43.5 23		34.57 32	9.0 21	
Dec. 5.7	7.17 34	49.7 21		40.45 53	24.2 19		26.91 59	41.7 18		34.91 34	6.8 22	
	34	22		54	14		61	13		34	22	
15.7	7.51	47.5		40.99	22.8		27.52	40.4		35.25	4.6	
25.7	7.85 34	45.3 22		41.52 53	22.0 8		28.13 61	39.7 7		35.59 34	2.5 21	
35.7	8.17 32	43.3 20		42.04 52	21.7 3		28.71 58	39.6 1		35.92 33	0.6 19	
Sec δ , Tan δ	1.003	+0.071		1.828	+1.531		2.145	+1.898		1.009	+0.137	
Mean Place	4 ^h .084	65 ^m .27		36 ^h .032	56 ^m .40		22 ^h .218	75 ^m .30		31 ^h .821	24 ^m .05	
D' ψ α , D ω α	0.00	0.00		+0.01	+0.10		+0.01	+0.12		0.00	+0.01	
D ψ δ , D ω δ	-0.4	+0.3		-0.4	+0.3		-0.4	+0.3		-0.4	+0.3	

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>ρ^4</i> Leonis. Mag. 5.7		<i>ψ</i> Ursæ Majoris. Mag. 3.2		<i>β</i> Crateris. Mag. 4.5		<i>δ</i> Leonis. Mag. 2.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 11 2	° ' + 2 25	h m 11 4	° ' +44 57	h m 11 7	° ' -22 20	h m 11 9	° ' +20 59
	s	"	s	"	s	"	s	"
Jan. 0.7	28.47	41.8	47.89	63.2	22.87	54.5	29.70	56.2
10.7	28.78 31	39.8 20	48.30 41	62.7 5	23.19 32	57.1 26	30.03 33	54.8 14
20.6	29.06 28	37.9 19	48.67 37	62.7 0	23.48 29	59.8 27	30.33 30	53.7 11
30.6	29.30 24	36.2 17	49.00 33	63.2 5	23.73 25	62.5 27	30.60 27	52.9 8
Feb. 9.6	29.50 20	34.8 14	49.27 27	64.1 9	23.93 20	65.2 27	30.83 23	52.5 4
	16	11	21	13	16	25	17	1
19.5	29.66	33.7	49.48	65.4	24.09	67.7	31.00	52.4
Mar. 1.5	29.77 11	32.8 9	49.62 14	67.0 16	24.20 11	70.0 23	31.12 12	52.7 3
	6	6	8	19	6	21	8	5
11.5	29.83	32.2	49.70	68.9	24.26	72.1	31.20	53.2
21.5	29.85 2	31.8 4	49.72 2	70.9 20	24.28 2	73.9 18	31.23 3	53.9 7
31.4	29.84 1	31.7 1	49.68 4	72.9 20	24.26 2	75.5 16	31.22 1	54.8 9
	4	0	9	19	4	13	4	10
Apr. 10.4	29.80	31.7	49.59	74.8	24.22	76.8	31.18	55.8
20.4	29.73 7	31.9 2	49.47 12	76.6 18	24.15 7	77.8 10	31.11 7	56.8 10
30.4	29.65 8	32.2 3	49.32 15	78.2 16	24.06 9	78.5 7	31.02 9	57.8 10
May 10.3	29.56 9	32.6 4	49.15 17	79.6 14	23.96 10	79.0 5	30.92 10	58.8 10
20.3	29.46 10	33.1 5	48.97 18	80.6 10	23.85 11	79.2 2	30.81 11	59.7 9
	10	5	18	7	12	1	11	7
30.3	29.36	33.6	48.79	81.3	23.73	79.1	30.70	60.4
June 9.2	29.26 10	34.2 6	48.61 18	81.6 3	23.61 12	78.7 4	30.59 11	61.0 6
19.2	29.17 9	34.8 6	48.45 16	81.6 0	23.50 11	78.1 6	30.49 10	61.4 4
29.2	29.09 8	35.4 6	48.30 15	81.2 4	23.40 10	77.2 9	30.40 9	61.6 2
July 9.2	29.02 7	35.9 5	48.17 13	80.4 8	23.31 9	76.2 10	30.32 8	61.6 0
	6	5	11	11	8	12	7	2
19.1	28.96	36.4	48.06	79.3	23.23	75.0	30.25	61.4
29.1	28.92 4	36.8 4	47.98 8	77.8 15	23.17 6	73.7 13	30.20 5	61.0 4
Aug. 8.1	28.90 2	37.1 3	47.93 5	76.0 18	23.13 4	72.3 14	30.18 2	60.4 6
18.1	28.90 0	37.4 3	47.91 2	74.0 20	23.11 2	70.9 14	30.18 0	59.6 8
28.0	28.93 3	37.5 1	47.93 2	71.7 23	23.12 1	69.5 14	30.20 2	58.6 10
	6	1	6	25	4	13	5	12
Sept. 7.0	28.99	37.4	47.99	69.2	23.16	68.2	30.25	57.4
17.0	29.08 9	37.1 3	48.09 10	66.5 27	23.24 8	67.1 11	30.34 9	56.0 14
26.9	29.20 12	36.5 6	48.24 15	63.7 28	23.36 12	66.2 9	30.46 12	54.4 16
Oct. 6.9	29.36 16	35.7 8	48.44 20	60.8 29	23.52 16	65.6 6	30.62 16	52.6 18
16.9	29.55 19	34.6 11	48.68 24	57.9 29	23.72 20	65.4 2	30.82 20	50.6 20
	23	13	29	29	24	1	23	22
26.9	29.78	33.3	48.97	55.0	23.96	65.5	31.05	48.4
Nov. 5.8	30.04 26	31.7 16	49.30 33	52.2 28	24.24 28	66.0 5	31.32 27	46.1 23
15.8	30.34 30	29.9 18	49.67 37	49.6 26	24.55 31	67.0 10	31.63 31	43.8 23
25.8	30.66 32	27.9 20	50.07 40	47.2 24	24.88 33	68.4 14	31.96 33	41.5 23
Dec. 5.8	30.99 33	25.8 21	50.50 43	45.1 21	25.23 35	70.2 18	32.31 35	39.3 22
	34	22	44	17	36	21	36	21
15.7	31.33	23.6	50.94	43.4	25.59	72.3	32.67	37.2
25.7	31.67 34	21.4 22	51.38 44	42.1 13	25.94 35	74.7 24	33.02 35	35.3 19
35.7	32.00 33	19.3 21	51.81 43	41.3 8	26.28 34	77.3 26	33.37 35	33.7 16
Sec δ , Tan δ	1.001	+0.042	1.413	+0.999	1.081	-0.411	1.071	+0.384
Mean Place	28°.001	41''.26	46°.697	74''.81	22°.634	62''.89	29°.043	61''.82
$D^* a$, $D_{\infty} a$	0.00	0.00	+0.01	+0.06	0.00	-0.03	0.00	+0.02
$D^* \delta$, $D_{\infty} \delta$	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Centauri. Mag. 4.3		ι Leonis. Mag. 4.0		τ Leonis. Mag. 5.2		λ Draconis. Mag. 4.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 11 17 s	° ' -54 0 "	h m 11 19 s	° ' +11 0 "	h m 11 23 s	° ' + 3 19 "	h m 11 26 s	° ' +69 48 "
Jan. 0.7	2.04	34.0	23.84	28.0	28.18	67.4	17.87	24.2
10.7	2.47 43	36.8 28	24.17 33	26.2 18	28.50 32	65.3 21	18.61 74	24.3 1
20.6	2.85 38	39.9 31	24.47 30	24.6 16	28.79 29	63.4 19	19.30 69	25.0 7
30.6	3.18 33	43.3 34	24.73 26	23.3 13	29.05 26	61.8 16	19.91 61	26.3 13
Feb. 9.6	3.45 27 20	46.9 36 36	24.95 22 17	22.3 10 6	29.27 22 17	60.4 14 11	20.42 51 40	28.1 18 22
19.6	3.65	50.5	25.12	21.7	29.44	59.3	20.82	30.3
Mar. 1.5	3.78 13	54.1 36	25.25 13	21.3 4	29.57 13	58.4 9	21.10 28	32.9 26
11.5	3.85 7	57.6 35	25.34 9	21.2 1	29.66 9	57.8 6	21.25 15	35.7 28
21.5	3.86 1	60.9 33	25.38 4	21.3 1	29.71 5	57.5 3	21.28 3	38.5 28
31.4	3.81 5 10	64.0 31 28	25.38 0 3	21.7 4 5	29.72 1 2	57.4 1 1	21.19 9 20	41.3 28 27
Apr. 10.4	3.71	66.8	25.35	22.2	29.70	57.5	20.99	44.0
20.4	3.57 14	69.2 24	25.30 5	22.8 6	29.65 5	57.7 2	20.70 29	46.4 24
30.4	3.40 17	71.3 21	25.23 7	23.5 7	29.58 7	58.1 4	20.34 36	48.4 20
May 10.3	3.20 20	73.0 17	25.14 9	24.2 7	29.50 8	58.6 5	19.92 42	50.1 17
20.3	2.98 22 24	74.2 12 7	25.05 9 10	24.9 7 7	29.41 9 9	59.1 5 6	19.46 46 48	51.3 12 7
30.3	2.74	74.9	24.95	25.6	29.32	59.7	18.98	52.0
June 9.3	2.49 25	75.2 3	24.85 10	26.2 6	29.22 10	60.3 6	18.50 48	52.2 2
19.2	2.25 24	75.0 2	24.76 9	26.7 5	29.13 9	60.9 6	18.03 47	51.8 4
29.2	2.01 24	74.4 6	24.68 8	27.1 4	29.04 9	61.4 5	17.58 45	50.9 9
July 9.2	1.78 23 21	73.3 11 15	24.60 8 7	27.4 3 2	28.96 8 7	61.9 5 5	17.16 42 37	49.6 13 18
19.1	1.57	71.8	24.53	27.6	28.89	62.4	16.79	47.8
29.1	1.39 18	70.0 18	24.48 5	27.7 1	28.84 5	62.8 4	16.48 31	45.5 23
Aug. 8.1	1.24 15	67.9 21	24.45 3	27.6 1	28.81 3	63.1 3	16.23 25	42.8 27
18.1	1.13 11	65.5 24	24.44 1	27.4 2	28.80 1	63.2 1	16.06 17	39.9 29
28.0	1.08 5 0	63.0 25 26	24.45 1 4	27.0 4 6	28.81 1 3	63.2 0 2	15.97 9 1	36.7 32 34
Sept. 7.0	1.08	60.4	24.49	26.4	28.84	63.0	15.96	33.3
17.0	1.14 6	57.9 25	24.56 7	25.5 9	28.90 6	62.6 4	16.03 7	29.7 36
27.0	1.27 13	55.5 24	24.67 11	24.4 11	29.00 10	62.0 6	16.19 16	26.0 37
Oct. 6.9	1.47 20	53.4 21	24.82 15	23.1 13	29.14 14	61.1 9	16.45 26	22.3 37
16.9	1.73 26 32	51.6 18 13	25.00 18 22	21.6 15 17	29.32 18 22	60.0 11 14	16.81 36 45	18.7 36 34
26.9	2.05	50.3	25.22	19.9	29.54	58.6	17.26	15.3
Nov. 5.8	2.43 38	49.5 8	25.47 25	18.0 19	29.79 25	57.0 16	17.80 54	12.1 32
15.8	2.86 43	49.3 2	25.76 29	15.9 21	30.07 28	55.2 18	18.41 61	9.2 29
25.8	3.33 47	49.7 4	26.08 32	13.7 22	30.38 31	53.2 20	19.09 68	6.7 25
Dec. 5.8	3.82 49 49	50.7 10 15	26.42 34 35	11.5 22 22	30.71 33 35	51.0 22 22	19.83 74 77	4.7 20 15
15.7	4.31	52.2	26.77	9.3	31.06	48.8	20.60	3.2
25.7	4.79 48	54.3 21	27.11 34	7.2 21	31.40 34	46.6 22	21.37 77	2.3 9
35.7	5.25 46	56.9 26	27.45 34	5.2 20	31.73 33	44.5 21	22.13 76	2.0 3
Sec δ , Tan δ	1.702	-1.377	1.019	+0.194	1.002	+0.058	2.897	+2.719
Mean Place	2 ^h .095	50'' .82	23 ^h .377	30'' .94	27 ^h .813	67'' .91	15 ^h .244	40'' .95
D' ψ α , D ω α	-0.01	-0.09	0.00	+0.01	0.00	0.00	+0.01	+0.18
D ψ δ , D ω δ	-0.4	+0.2	-0.4	+0.2	-0.4	+0.2	-0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ξ Hydræ. Mag. 3.7		λ Centauri. Mag. 3.3		υ Leonis. Mag. 4.5		π Chamæleonis. Mag. 5.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 11 28 s	° ' -31 22 "	h m 11 31 s	° ' -62 31 "	h m 11 32 s	° ' - 0 20 "	h m 11 33 s	° ' -75 24 "
Jan. 0.7	43.25	23.6	45.31	59.8	29.93	35.5	39.17	33.4
10.7	43.60 35	26.3 27	45.84 53	62.4 26	30.26 33	37.7 22	40.05 88	35.8 24
20.6	43.91 31	29.1 28	46.32 48	65.4 30	30.56 30	39.7 20	40.84 79	38.7 29
30.6	44.19 28	32.0 29	46.74 42	68.7 33	30.82 26	41.5 18	41.52 68	42.0 33
Feb. 9.6	44.42 23 18	35.0 30 29	47.08 34 26	72.3 36 37	31.04 22 18	43.1 16 13	42.07 55 41	45.6 36 38
19.6	44.60	37.9	47.34	76.0	31.22	44.4	42.48	49.4
Mar. 1.5	44.74 14	40.6 27	47.52 18	79.8 38	31.36 14	45.5 11	42.75 27	53.3 39
11.5	44.83 9	43.2 26	47.62 10	83.5 37	31.46 10	46.3 8	42.89 14	57.2 39
21.5	44.87 4	45.6 24	47.65 3	87.1 36	31.51 5	46.9 6	42.89 0	61.1 39
31.5	44.87 0 3	47.7 21 18	47.61 4 11	90.5 34 32	31.53 2 1	47.2 3 1	42.76 13 25	64.8 37 35
Apr. 10.4	44.84	49.5	47.50	93.7	31.52	47.3	42.51	68.3
20.4	44.78 6	51.0 15	47.33 17	96.6 29	31.48 4	47.2 1	42.15 36	71.6 33
30.4	44.70 8	52.2 12	47.12 21	99.1 25	31.42 6	47.0 2	41.69 46	74.5 29
May 10.3	44.60 10	53.1 9	46.86 26	101.2 21	31.34 8	46.7 3	41.15 54	76.9 24
20.3	44.48 12 12	53.7 6 2	46.57 29 32	102.8 16 11	31.25 9 9	46.3 4 5	40.54 61 67	78.9 20 16
30.3	44.36	53.9	46.25	103.9	31.16	45.8	39.87	80.5
June 9.3	44.23 13	53.8 1	45.92 33	104.5 6	31.07 9	45.2 6	39.17 70	81.5 10
19.2	44.10 13	53.4 4	45.58 34	104.7 2	30.98 9	44.6 6	38.45 72	82.0 5
29.2	43.97 13	52.7 7	45.24 34	104.4 3	30.89 9	44.0 6	37.72 73	81.9 1
July 9.2	43.85 12 11	51.7 10 12	44.91 33 31	103.6 8 13	30.81 8 7	43.4 6 5	37.02 70 67	81.2 7 11
19.2	43.74	50.5	44.60	102.3	30.74	42.9	36.35	80.1
29.1	43.64 10	49.1 14	44.32 28	100.5 18	30.68 6	42.4 5	35.75 60	78.5 16
Aug. 8.1	43.57 7	47.5 16	44.08 24	98.4 21	30.64 4	41.9 5	35.23 52	76.4 21
18.1	43.52 5	45.8 17	43.90 18	96.0 24	30.62 2	41.5 4	34.81 42	74.0 24
28.0	43.50 2 2	44.1 17 17	43.78 12 5	93.4 26 27	30.62 0 2	41.3 2 0	34.51 30 17	71.3 27 29
Sept. 7.0	43.52	42.4	43.73	90.7	30.64	41.3	34.34	68.4
17.0	43.57 5	40.8 16	43.76 3	88.0 27	30.70 6	41.5 2	34.33 1	65.4 30
27.0	43.67 10	39.4 14	43.88 12	85.3 27	30.79 9	41.9 4	34.48 15	62.5 29
Oct. 6.9	43.81 14	38.3 11	44.08 20	82.8 25	30.92 13	42.5 6	34.79 31	59.7 28
16.9	44.00 19 24	37.5 8 4	44.37 29 37	80.7 21 17	31.08 16 21	43.4 9 12	35.25 46 61	57.2 25 21
26.9	44.24	37.1	44.74	79.0	31.29	44.6	35.86	55.1
Nov. 5.9	44.52 28	37.2 1	45.18 44	77.8 12	31.54 25	46.1 15	36.60 74	53.5 16
15.8	44.83 31	37.7 5	45.69 51	77.1 7	31.82 28	47.8 17	37.45 85	52.4 11
25.8	45.18 35	38.7 10	46.25 56	77.0 1	32.12 30	49.7 19	38.38 93	51.9 5
Dec. 5.8	45.55 37 38	40.2 15 19	46.84 59 60	77.6 6 12	32.45 33 34	51.8 21 22	39.36 98 100	52.1 2 8
15.7	45.93	42.1	47.44	78.8	32.79	54.0	40.36	52.9
25.7	46.30 37	44.3 22	48.03 59	80.6 18	33.13 34	56.3 23	41.34 98	54.4 15
35.7	46.66 36	46.8 25	48.59 56	82.9 23	33.47 34	58.5 22	42.27 93	56.5 21
Sec δ, Tan δ	1.171	-0.610	2.169	-1.924	1.000	-0.006	3.971	-3.843
Mean Place	43°.219	34''.36	45°.642	78''.19	29°.655	35''.88	39°.922	53''.71
D'ψ α, Dω α	0.00	-0.04	-0.01	-0.13	0.00	0.00	-0.01	-0.25
Dψ δ, Dω δ	-0.4	+0.1	-0.4	+0.1	-0.4	+0.1	-0.4	+0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

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FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Virginis. Mag. 3.8		Groombridge 1830. Mag. 6.5		γ Ursæ Majoris. Mag. 2.5		π Virginis. Mag. 4.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 11 46 s	° ' + 2 14 "	h m 11 47 s	° ' +38 19 "	h m 11 49 s	° ' +54 10 "	h m 11 56 s	° ' + 7 5 "
Jan. 0.7	10.03	77.3	58.86	82.9	16.84	26.6	25.10	54.9
10.7	10.36 33	75.2 21	59.26 40	81.6 13	17.34 50	25.9 7	25.43 33	52.9 20
20.7	10.67 31	73.2 20	59.64 38	80.8 8	17.80 46	25.8 1	25.74 31	51.1 18
30.6	10.95 28	71.4 18	59.98 34	80.5 3	18.22 42	26.3 5	26.03 29	49.5 16
Feb. 9.6	11.19 24 20	69.9 15 12	60.28 30 25	80.6 1 6	18.58 36 30	27.3 10 15	26.28 25 21	48.2 13 9
19.6	11.39	68.7	60.53	81.2	18.88	28.8	26.49	47.3
Mar. 1.5	11.54 15	67.8 9	60.72 19	82.2 10	19.11 23	30.6 18	26.65 16	46.6 7
11.5	11.65 11	67.1 7	60.86 14	83.5 13	19.26 15	32.8 22	26.77 12	46.2 4
21.5	11.72 7	66.7 4	60.94 8	85.0 15	19.34 8	35.2 24	26.84 7	46.1 1
31.5	11.75 3 0	66.5 2 1	60.97 3 1	86.7 17 17	19.35 1 5	37.7 25 24	26.88 4 1	46.3 2 3
Apr. 10.4	11.75	66.6	60.96	88.4	19.30	40.1	26.89	46.6
20.4	11.72 3	66.8 2	60.91 5	90.1 17	19.19 11	42.4 23	26.87 2	47.0 4
30.4	11.67 5	67.1 3	60.83 8	91.7 16	19.03 16	44.5 21	26.83 4	47.6 6
May 10.4	11.61 6	67.5 4	60.72 11	93.1 14	18.84 19	46.4 19	26.77 6	48.3 7
20.3	11.53 8 8	68.0 5 6	60.60 12 13	94.3 12 9	18.63 21 23	47.9 15 11	26.69 8 8	49.0 7 7
30.3	11.45	68.6	60.47	95.2	18.40	49.0	26.61	49.7
June 9.3	11.36 9	69.2 6	60.33 14	95.8 6	18.16 24	49.7 7	26.52 9	50.3 6
19.2	11.27 9	69.8 6	60.19 14	96.1 3	17.93 23	49.9 2	26.43 9	50.9 6
29.2	11.18 9	70.4 6	60.05 14	96.0 1	17.70 23	49.7 2	26.34 9	51.5 6
July 9.2	11.10 8 8	70.9 5 5	59.93 12 11	95.6 4 8	17.48 22 20	49.0 7 11	26.25 9 8	52.0 5 4
19.2	11.02	71.4	59.82	94.8	17.28	47.9	26.17	52.4
29.1	10.95 7	71.8 4	59.73 9	93.7 11	17.11 17	46.4 15	26.09 8	52.6 2
Aug. 8.1	10.90 5	72.1 3	59.65 8	92.3 14	16.97 14	44.5 19	26.03 6	52.7 1
18.1	10.87 3	72.3 2	59.60 5	90.6 17	16.86 11	42.2 23	25.99 4	52.6 1
28.1	10.86 1 2	72.3 0 1	59.58 2 1	88.6 20 23	16.79 7 2	39.6 26 28	25.97 2 0	52.4 2 4
Sept. 7.0	10.88	72.2	59.59	86.3	16.77	36.8	25.97	52.0
17.0	10.92 4 8	71.9 3 6	59.63 4 9	83.7 26 27	16.80 3 8	33.7 31 33	26.00 3 7	51.4 6 8
27.0	11.00	71.3	59.72	81.0	16.88	30.4	26.07	50.6
Oct. 6.9	11.12 12	70.5 8	59.85 13	78.1 29	17.02 14	27.1 33	26.18 11	49.5 11
16.9	11.27 15 20	69.4 11 13	60.03 18 23	75.1 30 31	17.22 20 26	23.7 34 34	26.32 14 19	48.2 13 16
26.9	11.47	68.1	60.26	72.0	17.48	20.3	26.51	46.6
Nov. 5.9	11.71 24	66.5 16	60.53 27	68.9 31	17.80 32	17.0 33	26.74 23	44.8 18
15.8	11.98 27	64.7 18	60.85 32	65.9 30	18.17 37	13.9 31	27.00 26	42.8 20
25.8	12.28 30	62.7 20	61.20 35	63.0 29	18.59 42	11.1 28	27.29 29	40.7 21
Dec. 5.8	12.61 33 34	60.6 21 22	61.59 39 41	60.3 27 24	19.05 46 49	8.6 25 20	27.61 32 34	38.4 23 23
15.8	12.95	58.4	62.00	57.9	19.54	6.6	27.95	36.1
25.7	13.29 34	56.1 23	62.41 41	55.9 20	20.04 50	5.0 16	28.30 35	33.9 22
35.7	13.63 34	53.9 22	62.83 42	54.3 16	20.55 51	4.0 10	28.64 34	31.8 21
Sec δ , Tan δ	1.001	+0.039	1.275	+0.791	1.708	+1.385	1.008	+0.124
Mean Place	9 ^h .810	78 ^{''} .30	58 ^h .139	95 ^{''} .31	15 ^h .673	42 ^{''} .55	24 ^h .883	58 ^{''} .02
D ψ α , D ω α	0.00	0.00	0.00	+0.05	0.00	+0.09	0.00	+0.01
D ψ δ , D ω δ	-0.4	+0.1	-0.4	+0.1	-0.4	0.0	-0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♍ Virginis. Mag. 4.2		♋ Centauri. Mag. 2.9		♌ Corvi. Mag. 3.2		♉ H. Draconis. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 12 0	° ' + 9 12	h m 12 3	° ' -50 14	h m 12 5	° ' -22 8	h m 12 8	° ' +78 5
Jan. 0.7	46.88	54.0	50.14	1.8	38.75	2.7	11.73	39.0
10.7	47.22 34	52.0 20	50.59 45	4.2 24	39.10 35	5.1 24	12.92 119	38.8 2
20.7	47.54 32	50.2 18	51.00 41	6.9 27	39.43 33	7.6 25	14.06 114	39.2 4
30.6	47.83 29	48.7 15	51.37 37	9.9 30	39.73 30	10.2 26	15.11 105	40.3 11
Feb. 9.6	48.08 25	47.5 12	51.69 32	13.1 32	39.99 26	12.7 25	16.03 92	42.0 17
	21	8	27	33	21	24	77	21
19.6	48.29	46.7	51.96	16.4	40.20	15.1	16.80	44.1
Mar. 1.6	48.46 17	46.2 5	52.17 21	19.8 34	40.37 17	17.3 22	17.38 58	46.6 25
11.5	48.58 12	45.9 3	52.32 15	23.1 33	40.50 13	19.4 21	17.77 39	49.4 28
21.5	48.66 8	45.9 0	52.41 9	26.3 32	40.59 9	21.3 19	17.96 19	52.4 30
31.5	48.71 5	46.2 3	52.45 4	29.4 31	40.64 5	22.9 16	17.94 2	55.4 30
	1	5	0	28	2	14	21	29
Apr. 10.5	48.72	46.7	52.45	32.2	40.66	24.3	17.73	58.3
20.4	48.70 2	47.3 6	52.40 5	34.8 26	40.65 1	25.4 11	17.35 38	61.1 28
30.4	48.66 4	48.0 7	52.31 9	37.0 22	40.61 4	26.3 9	16.81 54	63.6 25
May 10.4	48.60 6	48.7 7	52.19 12	38.9 19	40.55 6	26.9 6	16.15 66	65.7 21
20.3	48.53 7	49.5 8	52.04 15	40.4 15	40.48 7	27.3 4	15.39 76	67.3 16
	9	7	17	11	9	2	84	11
30.3	48.44	50.2	51.87	41.5	40.39	27.5	14.55	68.4
June 9.3	48.35 9	50.9 7	51.68 19	42.2 7	40.29 10	27.4 1	13.66 89	68.9 5
19.3	48.26 9	51.5 6	51.48 20	42.4 2	40.19 10	27.0 4	12.76 90	68.9 0
29.2	48.17 9	52.1 6	51.27 21	42.2 2	40.08 11	26.5 5	11.87 89	68.4 5
July 9.2	48.08 9	52.5 4	51.06 21	41.6 6	39.97 11	25.8 7	11.01 86	67.3 11
	8	3	20	10	10	9	81	16
19.2	48.00	52.8	50.86	40.6	39.87	24.9	10.20	65.7
29.2	47.92 8	53.0 2	50.67 19	39.2 14	39.77 10	23.9 10	9.46 74	63.6 21
Aug. 8.1	47.85 7	53.0 0	50.51 16	37.5 17	39.69 8	22.8 11	8.81 65	61.1 25
18.1	47.80 5	52.9 1	50.37 14	35.5 20	39.62 7	21.6 12	8.27 54	58.2 29
28.1	47.78 2	52.6 3	50.27 10	33.3 22	39.58 4	20.4 12	7.85 42	55.0 32
	0	5	6	23	1	12	29	35
Sept. 7.0	47.78	52.1	50.21	31.0	39.57	19.2	7.56	51.5
17.0	47.81 3	51.3 8	50.21 0	28.7 23	39.59 2	18.1 11	7.42 14	47.8 37
27.0	47.87 6	50.3 10	50.27 6	26.5 22	39.65 6	17.2 9	7.42 0	44.0 38
Oct. 7.0	47.97 10	49.1 12	50.39 12	24.4 21	39.75 10	16.6 6	7.58 16	40.1 39
16.9	48.11 14	47.7 14	50.57 18	22.6 18	39.89 14	16.2 4	7.90 32	36.2 39
	18	17	25	15	19	1	49	38
26.9	48.29	46.0	50.82	21.1	40.08	16.1	8.39	32.4
Nov. 5.9	48.51 22	44.1 19	51.13 31	20.1 10	40.32 24	16.4 3	9.04 65	28.9 35
15.9	48.77 26	42.0 21	51.50 37	19.6 5	40.59 27	17.1 7	9.84 80	25.7 32
25.8	49.07 30	39.8 22	51.91 41	19.6 0	40.90 31	18.2 11	10.77 93	22.8 29
Dec. 5.8	49.39 32	37.6 22	52.36 45	20.1 5	41.24 34	19.7 15	11.81 104	20.4 24
	34	23	47	11	35	18	112	19
15.8	49.73	35.3	52.83	21.2	41.59	21.5	12.93	18.5
25.7	50.08 35	33.1 22	53.30 47	22.8 16	41.95 36	23.6 21	14.11 118	17.2 13
35.7	50.42 34	31.0 21	53.76 46	24.9 21	42.31 36	25.9 23	15.31 120	16.6 6
Sec δ, Tan δ	1.013	+0.162	1.564	-1.202	1.080	-0.407	4.848	+4.743
Mean Place	46°.680	58''.00	50°.606	16''.90	38°.882	9''.45	8°.259	58''.76
D _☉ α, D _☉ α	0.00	+0.01	0.00	-0.08	0.00	-0.03	0.00	+0.32
D _☉ δ, D _☉ δ	-0.4	0.0	-0.4	0.0	-0.4	0.0	-0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Crucis. Mag. 3.1			δ Ursæ Majoris. Mag. 3.4			γ Corvi. Mag. 2.8			ε Canum Venat. Mag. 5.8		
	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	12	10	−58 15	12	11	+57 30	12	11	−17 3	12	11	+41 8
	s		"	s		"	s		"	s		"
Jan. 0.7	30.65		38.3	8.76		39.9	19.67		27.0	46.89		25.3
10.7	31.17	52	40.5 22	9.29	53	39.1 8	20.01	34	29.3 23	47.30	41	24.0 13
20.7	31.66	49	43.1 26	9.80	51	38.9 2	20.33	32	31.7 24	47.69	39	23.2 8
30.6	32.10	44	46.1 30	10.27	47	39.3 4	20.63	30	34.1 24	48.05	36	23.0 2
Feb. 9.6	32.48	38	49.4 33	10.68	41	40.2 9	20.89	26	36.4 23	48.37	32	23.3 3
		32	35		35	14		22	22		27	7
19.6	32.80		52.9	11.03		41.6	21.11		38.6	48.64		24.0
Mar. 1.6	33.05	25	56.4 35	11.30	27	43.5 19	21.29	18	40.6 20	48.86	22	25.1 11
		18	35		20	22		13	18		16	15
11.5	33.23	11	59.9 35	11.50	12	45.7 25	21.42	9	42.4 16	49.02	10	26.6 18
21.5	33.34	5	63.4 34	11.62	4	48.2 26	21.51	6	44.0 13	49.12	5	28.4 20
31.5	33.39	1	66.8 32	11.66	3	50.8 26	21.57	2	45.3 11	49.17	1	30.4 21
Apr. 10.5	33.38		70.0	11.63		53.4	21.59		46.4	49.18		32.5
20.4	33.32	6	72.9 29	11.54	9	55.9 25	21.59	0	47.3 9	49.14	4	34.6 21
30.4	33.21	11	75.5 26	11.39	15	58.3 24	21.56	3	47.9 6	49.06	8	36.6 20
May 10.4	33.06	15	77.7 22	11.20	19	60.4 21	21.51	5	48.3 4	48.95	11	38.4 18
20.3	32.87	19	79.5 18	10.98	22	62.1 17	21.44	7	48.5 2	48.82	13	40.0 16
		22	14		25	13		8	0		14	13
30.3	32.65		80.9	10.73		63.4	21.36		48.5	48.68		41.3
June 9.3	32.41	24	81.9 10	10.46	27	64.3 9	21.27	9	48.3 2	48.53	15	42.2 9
19.3	32.14	27	82.4 5	10.18	28	64.7 4	21.17	10	47.9 4	48.37	16	42.8 6
29.2	31.86	28	82.4 0	9.91	27	64.7 0	21.07	10	47.4 5	48.21	16	43.1 3
July 9.2	31.58	28	82.0 4	9.65	26	64.2 5	20.97	10	46.7 7	48.05	16	43.0 1
		27	9		25	10		10	8		15	5
19.2	31.31		81.1	9.40		63.2	20.87		45.9	47.90		42.5
29.2	31.05	26	79.8 13	9.18	22	61.8 14	20.78	9	45.0 9	47.77	13	41.6 9
Aug. 8.1	30.82	23	78.1 17	8.99	19	59.9 19	20.70	8	44.1 9	47.65	12	40.3 13
		20	20		16	23		6	10		9	16
18.1	30.62	15	76.1 23	8.83	12	57.6 26	20.64	4	43.1 10	47.56	7	38.7 19
28.1	30.47	9	73.8 25	8.71	8	55.0 29	20.60	2	42.1 9	47.49	3	36.8 22
Sept. 7.0	30.38		71.3	8.63		52.1	20.58		41.2	47.46		34.6
17.0	30.35	3	68.7 26	8.61	2	49.0 31	20.60	2	40.4 8	47.46	0	32.1 25
27.0	30.39	4	66.2 25	8.65	4	45.6 34	20.65	5	39.8 6	47.51	5	29.4 27
Oct. 7.0	30.51	12	63.8 24	8.75	10	42.1 35	20.74	9	39.4 4	47.60	9	26.5 29
16.9	30.71	20	61.6 22	8.92	17	38.6 35	20.88	14	39.3 1	47.74	14	23.5 30
		28	18		23	36		18	2		19	31
26.9	30.99		59.8	9.15		35.0	21.06		39.5	47.93		20.4
Nov. 5.9	31.34	35	58.4 14	9.45	30	31.5 35	21.28	22	40.1 6	48.18	25	17.3 31
		42	9		36	33		26	9		29	31
15.9	31.76	48	57.5 4	9.81	42	28.2 30	21.54	30	41.0 13	48.47	33	14.2 30
25.8	32.24	52	57.1 2	10.23	47	22.5 27	21.84	33	42.3 16	48.80	37	11.2 27
Dec. 5.8	32.76	54	57.3 8	10.70	51	22.5 23	22.17	35	43.9 18	49.17	40	8.5 24
15.8	33.30		58.1	11.21		20.2	22.52		45.7	49.57		6.1
25.7	33.85	55	59.5 14	11.74	53	18.5 17	22.88	36	47.8 21	49.98	41	4.1 20
35.7	34.39	54	61.4 19	12.28	54	17.3 12	23.23	35	50.1 23	50.40	42	2.5 16
Sec δ, Tan δ	1.901		−1.617	1.862		+1.570	1.046		−0.307	1.328		+0.874
Mean Place	31°.364		55''.07	7°.678		57''.57	19°.778		31''.82	46°.291		39''.53
D'ψ α, Dω α	0.00		−0.11	0.00		+0.10	0.00		−0.02	0.00		+0.06
Dψ δ, Dω δ	−0.4		0.0	−0.4		0.0	−0.4		0.0	−0.4		−0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Chamseleontis. Mag. 4.4			η Virginis. Mag. 4.0			α^1 Crucis. Mag. 1.6			20 Comae. Mag. 5.7		
	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	12	13	-78 49	12	15	- 0 11	12	21	-62 36	12	25	+21 22
	s		"	s		"	s		"	s		"
Jan. 0.7	10.82		25.1	27.31		1.5	43.94		44.2	21.34		31.0
10.7	12.03	121	26.9 18	27.65	34	3.7 22	44.54	60	46.2 20	21.70	36	29.1 19
20.7	13.16	113	29.3 24	27.97	32	5.8 21	45.09	55	48.7 25	22.04	34	27.6 15
30.7	14.18	102	32.2 29	28.26	29	7.6 18	45.59	50	51.6 29	22.36	32	26.5 11
Feb. 9.6	15.06	88	35.4 32	28.52	26	9.2 16	46.03	44	54.8 32	22.64	28	25.8 7
		72	35.4 35		22	14		37	54.8 34		24	25.8 3
19.6	15.78		38.9	28.74		10.6	46.40		58.2	22.88		25.5
Mar. 1.6	16.34	56	42.6 37	28.92	18	11.7 11	46.70	30	61.7 35	23.08	20	25.6 1
11.5	16.72	38	46.5 39	29.06	14	8	46.93	23	65.3 36	23.23	15	26.0 4
21.5	16.93	21	50.4 39	29.16	10	5	47.08	15	68.9 36	23.34	11	26.7 7
31.5	16.97	4	54.3 39	29.22	6	3	47.15	7	72.4 35	23.41	7	27.7 10
		12	54.3 37		3	1		1	72.4 33		3	27.7 12
Apr. 10.5	16.85		58.0	29.25		13.4	47.16		75.7	23.44		28.9
20.4	16.57	28	61.5 35	29.25	0	13.3 1	47.11	5	78.8 31	23.44	0	30.1 12
30.4	16.15	42	64.8 33	29.22	3	2	47.00	11	81.6 28	23.41	3	31.4 13
May 10.4	15.60	55	67.7 29	29.17	5	4	46.83	17	84.1 25	23.36	5	32.7 13
20.4	14.93	67	70.2 25	29.11	6	5	46.62	21	86.2 21	23.29	7	33.9 12
		78	70.2 21		7	5		25	86.2 17		9	33.9 11
30.3	14.15		72.3	29.04		11.7	46.37		87.9	23.20		35.0
June 9.3	13.30	85	73.9 16	28.96	8	5	46.08	29	89.1 12	23.10	10	36.0 10
19.3	12.39	91	74.9 10	28.87	9	6	45.77	31	89.8 7	23.00	10	36.8 8
29.2	11.44	95	75.4 5	28.78	9	6	45.44	33	90.1 3	22.89	11	37.4 6
July 9.2	10.49	95	75.4 0	28.69	9	6	45.11	33	89.9 2	22.78	11	37.7 3
		93	75.4 6		9	5		33	89.9 7		10	37.7 1
19.2	9.56		74.8	28.60		8.9	44.78		89.2	22.68		37.8
29.2	8.67	89	73.7 11	28.52	8	5	44.46	32	88.0 12	22.58	10	37.6 2
Aug. 8.1	7.86	81	72.1 16	28.45	7	4	44.17	29	86.4 16	22.49	9	37.2 4
18.1	7.16	70	70.0 21	28.39	6	3	43.92	25	84.4 20	22.42	7	36.5 7
28.1	6.60	56	67.6 24	28.35	4	1	43.72	20	82.1 23	22.37	5	35.6 9
		39	67.6 27		1	0		14	82.1 25		3	35.6 11
Sept. 7.1	6.21		64.9	28.34		7.6	43.58		79.6	22.34		34.5
17.0	6.00	21	62.0 29	28.35	1	2	43.51	7	77.0 26	22.34	0	33.1 14
27.0	5.99	1	59.0 30	28.39	4	4	43.53	2	74.4 26	22.38	4	31.4 17
Oct. 7.0	6.19	20	56.1 29	28.48	9	6	43.64	11	71.8 26	22.45	7	29.5 19
16.9	6.60	41	53.3 28	28.61	13	9	43.84	20	69.4 24	22.56	11	27.4 21
		62	53.3 25		17	12		29	69.4 20		16	27.4 23
26.9	7.22		50.8	28.78		10.9	44.13		67.4	22.72		25.1
Nov. 5.9	8.03	81	48.7 21	28.99	21	14	44.51	38	65.7 17	22.92	20	22.6 25
15.9	9.01	98	47.1 16	29.24	25	17	44.96	45	64.5 12	23.17	25	20.0 26
25.8	10.12	111	46.0 11	29.53	29	19	45.48	52	63.9 6	23.46	29	17.4 26
Dec. 5.8	11.33	121	45.5 5	29.84	31	21	46.05	57	63.8 1	23.78	32	14.8 26
		127	45.5 2		33	22		60	63.8 5		34	14.8 24
15.8	12.60		45.7	30.17		20.2	46.65		64.3	24.12		12.4
25.8	13.89	129	46.5 8	30.51	34	22	47.26	61	65.4 11	24.48	36	10.1 23
35.7	15.15	126	48.0 15	30.86	35	22	47.87	61	67.1 17	24.84	36	8.0 21
Sec δ , Tan δ	5.163		-5.065	1.000		-0.003	2.174		-1.931	1.074		+0.391
Mean Place	13 ^s .034		44 ^{''} .95	27 ^s .290		0 ^{''} .20	44 ^s .933		61 ^{''} .45	21 ^s .144		40 ^{''} .01
D ['] ϕ α , D ω α	+0.01		-0.34	0.00		0.00	0.00		-0.13	0.00		+0.03
D ['] δ , D ω δ	-0.4		-0.1	-0.4		-0.1	-0.4		-0.1	-0.4		-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Corvi. Mag. 3.1		γ Crucis. Mag. 1.6		8 Canum Venat. Mag. 4.3		κ Draconis. Mag. 3.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 12 25 s	° ' -16 1	h m 12 26 s	° ' -56 37	h m 12 29 s	° ' +41 49	h m 12 29 s	° ' +70 15
Jan. 0.7	21.47	48.3	18.97	17.6	37.39	33.1	48.25	43.6
10.7	21.82 35	50.6 23	19.49 52	19.7 21	37.80 41	31.6 15	49.02 77	42.9 7
20.7	22.15 33	52.9 23	19.98 49	22.2 25	38.20 40	30.7 9	49.77 75	42.8 1
30.7	22.45 30	55.2 23	20.42 44	25.0 28	38.57 37	30.3 4	50.47 70	43.3 5
Feb. 9.6	22.72 27	57.4 22	20.81 39	28.1 31	38.90 33	30.5 2	51.10 63	44.5 12
	23	21	34	33	29	7	54	17
19.6	22.95	59.5	21.15	31.4	39.19	31.2	51.64	46.2
Mar. 1.6	23.14 19	61.4 19	21.42 27	34.8 34	39.43 24	32.3 11	52.08 44	48.4 22
	15	18	21	35	18	15	32	26
11.5	23.29 11	63.2 15	21.63 14	38.3 34	39.61 12	33.8 18	52.40 20	51.0 28
21.5	23.40 7	64.7 13	21.77 8	41.7 33	39.73 7	35.6 20	52.60 7	53.8 29
31.5	23.47 4	66.0 10	21.85 3	45.0 31	39.80 2	37.6 21	52.67 4	56.7 29
Apr. 10.5	23.51	67.0	21.88	48.1	39.82	39.7	52.63	59.6
20.4	23.52 1	67.8 8	21.86 2	51.0 29	39.80 2	41.9 22	52.48 15	62.4 28
30.4	23.50 2	68.4 6	21.79 7	53.6 26	39.74 6	44.0 21	52.23 25	65.0 26
May 10.4	23.46 4	68.8 4	21.67 12	55.9 23	39.64 10	46.0 20	51.90 33	67.3 23
20.4	23.40 6	69.0 2	21.51 16	57.8 19	39.52 12	47.7 17	51.50 40	69.2 19
	7	0	19	16	14	15	45	15
30.3	23.33	69.0	21.32	59.4	39.38	49.2	51.05	70.7
June 9.3	23.25 8	68.8 2	21.11 21	60.5 11	39.22 16	50.4 12	50.57 48	71.7 10
19.3	23.16 9	68.5 3	20.87 24	61.1 6	39.06 16	51.2 8	50.06 51	72.2 5
29.2	23.06 10	68.0 5	20.62 25	61.3 2	38.89 17	51.6 4	49.55 51	72.1 1
July 9.2	22.96 10	67.4 6	20.36 26	61.0 3	38.73 16	51.6 0	49.04 51	71.5 6
	10	8	26	7	16	4	48	12
19.2	22.86	66.6	20.10	60.3	38.57	51.2	48.56	70.3
29.2	22.77 9	65.8 8	19.85 25	59.2 11	38.42 15	50.4 8	48.11 45	68.7 16
Aug. 8.1	22.68 9	64.9 9	19.62 23	57.7 15	38.28 14	49.3 11	47.70 41	66.6 21
	8	9	20	19	12	15	35	25
18.1	22.60	64.0	19.42	55.8	38.16	47.8	47.35	64.1
28.1	22.55 5	63.1 9	19.26 16	53.6 22	38.07 9	45.9 19	47.06 29	61.2 29
	3	8	11	24	6	22	22	32
Sept. 7.1	22.52	62.3	19.15	51.2	38.01	43.7	46.84	58.0
17.0	22.52 0	61.6 7	19.10 5	48.8 24	37.99 2	41.3 24	46.71 13	54.5 35
27.0	22.56 4	61.1 5	19.12 2	46.4 24	38.01 2	38.6 27	46.67 4	50.8 37
Oct. 7.0	22.64 8	60.8 3	19.21 9	44.0 24	38.07 6	35.7 29	46.72 5	47.0 38
16.9	22.76 12	60.7 1	19.38 17	41.8 22	38.18 11	32.6 31	46.87 15	43.2 38
	17	2	25	19	16	32	26	38
26.9	22.93	60.9	19.63	39.9	38.34	29.4	47.13	39.4
Nov. 5.9	23.14 21	61.5 6	19.95 32	38.5 14	38.56 22	26.2 32	47.50 37	35.7 37
15.9	23.40 26	62.4 9	20.34 39	37.5 10	38.83 27	23.0 32	47.97 47	32.2 35
25.8	23.69 29	63.7 13	20.78 44	37.0 5	39.15 32	20.0 30	48.53 56	29.1 31
Dec. 5.8	24.01 32	65.3 16	21.27 49	37.1 1	39.51 36	17.2 28	49.17 64	26.3 28
	34	18	52	7	39	26	70	23
15.8	24.35	67.1	21.79	37.8	39.90	14.6	49.87	24.0
25.8	24.70 35	69.1 20	22.32 53	39.0 12	40.31 41	12.4 22	50.62 75	22.3 17
35.7	25.05 35	71.4 23	22.85 53	40.8 18	40.72 41	10.7 17	51.39 77	21.2 11
Sec δ, Tan δ	1.040	-0.287	1.818	-1.518	1.342	+0.895	2.961	+2.787
Mean Place	21 ^h .660	52 ^m .20	19 ^h .814	33 ^m .55	36 ^h .912	48 ^m .21	46 ^h .614	63 ^m .72
D'ψ a, Dω a	0.00	-0.02	0.00	-0.10	0.00	+0.06	-0.01	+0.18
Dψ δ, Dω δ	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1	-0.4	-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Centauri. Mag. 2.4		γ Virginis (mean). Mag. 2.9		ρ Virginis. Mag. 5.0		76 Ursæ Majoris. Mag. 5.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 12 36 s	° ' -48 28 "	h m 12 37 s	° ' - 0 58 "	h m 12 37 s	° ' +10 42 "	h m 12 37 s	° ' +63 10 "
Jan. 0.7	42.04	42.2	15.03	22.3	28.91	47.4	47.15	66.4
10.7	42.50 46	44.3 21	15.37 34	24.5 22	29.25 34	45.3 21	47.76 61	65.4 10
20.7	42.93 43	46.7 24	15.69 32	26.6 21	29.58 33	43.5 18	48.35 59	65.0 4
30.7	43.32 39	49.4 27	15.99 30	28.5 19	29.89 31	42.0 15	48.91 56	65.3 3
Feb. 9.6	43.67 35	52.3 29	16.26 27	30.2 17	30.17 28	40.8 12	49.41 50	66.2 9
	31	31	23	14	24	9	44	14
19.6	43.98	55.4	16.49	31.6	30.41	39.9	49.85	67.6
Mar. 1.6	44.24 26	58.6 32	16.69 20	32.7 11	30.61 20	39.4 5	50.21 36	69.5 19
11.6	44.44 20	61.7 31	16.85 16	33.6 9	30.77 16	39.2 2	50.48 27	71.8 23
21.5	44.59 15	64.8 31	16.97 12	34.2 6	30.89 12	39.3 1	50.66 18	74.4 26
31.5	44.69 10	67.8 30	17.05 8	34.5 3	30.97 8	39.7 4	50.75 9	77.2 28
	5	28	5	1	5	6	0	28
Apr. 10.5	44.74	70.6	17.10	34.6	31.02	40.3	50.75	80.0
20.4	44.74 0	73.1 25	17.12 2	34.6 0	31.04 2	41.0 7	50.67 8	82.7 27
30.4	44.71 3	75.4 23	17.11 1	34.4 2	31.03 1	41.8 8	50.52 15	85.3 26
May 10.4	44.64 7	77.4 20	17.08 3	34.0 4	31.00 3	42.7 9	50.31 21	87.7 24
20.4	44.54 10	79.1 17	17.04 4	33.5 5	30.95 5	43.7 10	50.05 26	89.7 20
	13	13	6	5	7	9	30	16
30.3	44.41	80.4	16.98	33.0	30.88	44.6	49.75	91.3
June 9.3	44.26 15	81.3 9	16.90 8	32.4 6	30.80 8	45.4 8	49.42 33	92.4 11
19.3	44.09 17	81.8 5	16.82 8	31.8 6	30.71 9	46.1 7	49.07 35	93.1 7
29.3	43.90 19	81.9 1	16.73 9	31.2 6	30.62 9	46.7 6	48.71 36	93.3 2
July 9.2	43.70 20	81.6 3	16.64 9	30.7 5	30.52 10	47.2 5	48.36 35	92.9 4
	20	7	10	5	10	4	34	9
19.2	43.50	80.9	16.54	30.2	30.42	47.6	48.02	92.0
29.2	43.31 19	79.9 10	16.45 9	29.7 5	30.33 9	47.8 2	47.70 32	90.7 13
Aug. 8.1	43.13 18	78.5 14	16.36 9	29.3 4	30.24 9	47.8 0	47.41 29	88.9 18
18.1	42.97 16	76.8 17	16.28 8	29.0 3	30.17 7	47.6 2	47.15 26	86.7 22
28.1	42.84 13	74.9 19	16.22 6	28.8 2	30.11 6	47.3 3	46.93 22	84.1 26
	9	21	3	1	4	6	16	30
Sept. 7.1	42.75	72.8	16.19	28.7	30.07	46.7	46.77	81.1
17.0	42.71 4	70.6 22	16.18 1	28.8 1	30.06 1	45.9 8	46.67 10	77.8 33
27.0	42.72 1	68.4 22	16.20 2	29.2 4	30.09 3	44.8 11	46.64 3	74.3 35
(Oct. 7.0	42.79 7	66.4 20	16.27 7	29.8 6	30.15 6	43.5 13	46.68 4	70.7 36
17.0	42.92 13	64.6 18	16.38 11	30.6 8	30.25 10	42.0 15	46.79 11	67.0 37
	20	16	15	11	15	18	20	38
26.9	43.12	63.0	16.53	31.7	30.40	40.2	46.99	63.2
Nov. 5.9	43.39 27	61.8 12	16.72 19	33.1 14	30.59 19	38.2 20	47.27 28	59.5 37
15.9	43.72 33	61.0 8	16.95 23	34.7 16	30.82 23	36.1 21	47.63 36	56.0 35
25.8	44.10 38	60.8 2	17.22 27	36.6 19	31.09 27	33.8 23	48.06 43	52.8 32
Dec. 5.8	44.52 42	61.1 3	17.53 31	38.6 20	31.40 31	31.4 24	48.56 50	49.9 29
	45	8	33	21	33	23	55	25
15.8	44.97	61.9	17.86	40.7	31.73	29.1	49.11	47.4
25.8	45.43 46	63.2 13	18.20 34	42.9 22	32.07 34	26.8 23	49.69 58	45.4 20
35.7	45.89 46	64.9 17	18.54 34	45.1 22	32.41 34	24.6 22	50.29 60	44.0 14
Sec δ , Tan δ	1.509	-1.130	1.000	-0.017	1.018	+0.189	2.217	+1.978
Mean Place	42 ^s .774	55 ^{''} .85	15 ^s .130	20 ^{''} .52	28 ^s .900	53 ^{''} .42	46 ^s .126	86 ^{''} .05
D' ψ α , D ω α	0.00	-0.07	0.00	0.00	0.00	+0.01	-0.01	+0.13
D ψ δ , D ω δ	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>β</i> Crucis. Mag. 1.5		81 Comae. Mag. 5.1		88 H. Camelop. seq. Mag. 5.3		<i>n</i> Centauri. Mag. 4.3	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 12 42	° ' -59 12	h m 12 47	° ' +28 0	h m 12 48	° ' +83 52	h m 12 48	° ' -39 42
	s	"	s	"	s	"	s	"
Jan. 0.8	36.61	32.3	27.84	38.1	33.27	47.2	36.16	10.5
10.7	37.17 56	34.1 18	28.21 37	36.2 19	35.44 217	46.6 6	36.57 41	12.5 20
20.7	37.70 53	36.4 23	28.57 36	34.8 14	37.59 215	46.6 0	36.96 39	14.8 23
30.7	38.19 49	39.1 27	28.91 34	33.8 10	39.65 206	47.3 7	37.33 37	17.4 26
Feb. 9.6	38.63 44	42.1 30	29.21 30	33.2 6	41.53 188	48.6 13	37.66 33	20.1 27
	38	32	27	1	164	18	29	28
19.6	39.01	45.3	29.48	33.1	43.17	50.4	37.95	22.9
Mar. 1.6	39.33 32	48.6 33	29.71 23	33.5 4	44.52 135	52.7 23	38.20 25	25.7 28
11.6	39.58 25	52.0 34	29.89 18	34.2 7	45.52 100	55.4 27	38.40 20	28.5 28
21.5	39.77 19	55.5 35	30.03 14	35.3 11	46.15 63	58.4 30	38.55 15	31.2 27
31.5	39.89 12	58.9 34	30.12 9	36.7 14	46.40 25	61.5 31	38.66 11	33.7 25
	6	32	5	15	14	31	7	24
Apr. 10.5	39.95	62.1	30.17	38.2	46.26	64.6	38.73	36.1
20.5	39.95 0	65.1 30	30.19 2	39.8 16	45.75 51	67.5 29	38.76 3	38.3 22
30.4	39.90 5	67.9 28	30.17 2	41.5 17	44.91 84	70.2 27	38.76 0	40.2 19
May 10.4	39.80 10	70.4 25	30.13 4	43.1 16	43.77 114	72.6 24	38.72 4	41.8 16
20.4	39.65 15	72.5 21	30.06 7	44.7 16	42.37 140	74.5 19	38.66 6	43.1 13
	19	17	9	14	160	15	9	10
30.3	39.46	74.2	29.97	46.1	40.77	76.0	38.57	44.1
June 9.3	39.24 22	75.5 13	29.86 11	47.3 12	39.02 175	77.0 10	38.46 11	44.8 7
19.3	38.99 25	76.4 9	29.75 11	48.2 9	37.17 185	77.5 5	38.33 13	45.2 4
29.3	38.72 27	76.8 4	29.63 12	48.8 6	35.27 190	77.4 1	38.19 14	45.2 0
July 9.2	38.44 28	76.8 0	29.51 12	49.2 4	33.37 190	76.7 7	38.04 15	44.9 3
	29	5	13	1	185	12	15	6
19.2	38.15	76.3	29.38	49.3	31.52	75.5	37.89	44.3
29.2	37.87 28	75.4 9	29.26 12	49.0 3	29.77 175	73.7 18	37.74 15	43.4 9
Aug. 8.2	37.60 27	74.0 14	29.15 11	48.5 5	28.15 162	71.5 22	37.59 15	42.2 12
18.1	37.36 24	72.2 18	29.05 10	47.7 8	26.70 145	68.9 26	37.46 13	40.7 15
28.1	37.16 20	70.1 21	28.97 8	46.5 12	25.45 125	65.9 30	37.35 11	39.1 16
	15	23	6	15	102	34	8	17
Sept. 7.1	37.01	67.8	28.91	45.0	24.43	62.5	37.27	37.4
17.0	36.92 9	65.3 25	28.88 3	43.3 17	23.67 76	58.9 36	37.23 4	35.6 18
27.0	36.91 1	62.8 25	28.89 1	41.3 20	23.20 47	55.1 38	37.23 0	33.8 18
Oct. 7.0	36.97 6	60.3 25	28.93 4	39.1 22	23.02 18	51.2 39	37.28 5	32.1 17
17.0	37.12 15	58.0 23	29.02 9	36.6 25	23.15 13	47.2 40	37.39 11	30.7 14
	24	20	14	27	45	39	17	12
26.9	37.36	56.0	29.16	33.9	23.60	43.3	37.56	29.5
Nov. 5.9	37.67 31	54.3 17	29.35 19	31.1 28	24.37 77	39.6 37	37.79 23	28.7 8
15.9	38.06 39	53.0 13	29.58 23	28.3 28	25.46 109	36.1 35	38.07 28	28.3 4
25.9	38.52 46	52.3 7	29.85 27	25.5 28	26.84 138	32.9 32	38.40 33	28.4 1
Dec. 5.8	39.03 51	52.1 2	30.16 31	22.7 28	28.48 164	30.2 27	38.77 37	28.9 5
	55	4	34	26	187	23	40	9
15.8	39.58	52.5	30.50	20.1	30.35	27.9	39.17	29.8
25.8	40.14 56	53.4 9	30.86 36	17.7 24	32.38 203	26.2 17	39.58 41	31.2 14
35.7	40.71 57	54.9 15	31.23 37	15.6 21	34.50 212	25.2 10	40.00 42	33.0 18
Sec δ, Tan δ	1.954	-1.679	1.133	+0.532	9.382	+9.328	1.300	-0.830
Mean Place	37°.717	48''.21	27°.711	50''.08	28°.663	68''.80	36°.810	21''.25
D'ψ <i>a</i> , D _∞ <i>a</i>	+0.01	-0.11	0.00	+0.03	-0.05	+0.61	0.00	-0.05
Dψ δ, D _∞ δ	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Ursæ Majoris. Mag. 1.7		δ Virginia. Mag. 3.7		α Can. Ven. seq. Mag. 2.9		δ Muscæ. Mag. 3.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 12 50 s	° ' +56 25 "	h m 12 51 s	° ' + 3 51 "	h m 12 51 s	° ' +38 46 "	h m 12 56 s	° ' -71 4 "
Jan. 0.8	12.97	35.8	13.08	68.1	57.86	61.7	13.89	29.9
10.7	13.48 51	34.4 14	13.42 34	66.0 21	58.26 40	60.0 17	14.71 82	31.3 14
20.7	13.98 50	33.7 7	13.75 33	64.0 20	58.65 39	58.8 12	15.51 80	33.2 19
30.7	14.46 48	33.6 1	14.06 31	62.2 18	59.02 37	58.1 7	16.26 75	35.6 24
Feb. 9.6	14.90 44 39	34.1 5 11	14.34 28 25	60.7 15 12	59.36 34 30	57.9 2 4	16.93 67 59	38.4 28 32
19.6	15.29	35.2	14.59	59.5	59.66	58.3	17.52	41.6
Mar. 1.6	15.61 32	36.8 16	14.80 21	58.6 9	59.91 25	59.2 9	18.02 50	45.0 34
11.6	15.86 25	38.8 20	14.97 17	58.0 6	60.11 20	60.5 13	18.43 41	48.6 36
21.5	16.04 18	41.1 23	15.10 13	57.7 3	60.26 15	62.1 16	18.73 30	52.2 36
31.5	16.15 11 4	43.7 26 27	15.20 10 6	57.7 0 2	60.36 10 5	64.0 19 20	18.93 20 11	55.9 37 36
Apr. 10.5	16.19	46.4	15.26	57.9	60.41	66.0	19.04	59.5
20.5	16.16 3	49.0 26	15.29 3	58.3 4	60.42 1	68.1 21	19.05 1	62.9 34
30.4	16.07 9	51.6 26	15.30 1	58.8 5	60.39 3	70.2 21	18.97 8	66.2 33
May 10.4	15.94 13	54.0 24	15.28 2	59.4 6	60.32 7	72.2 20	18.80 17	69.2 30
20.4	15.76 18 21	56.1 21 17	15.24 4 6	60.0 6 7	60.23 9 11	74.0 18 16	18.55 25 32	71.8 26 23
30.3	15.55	57.8	15.18	60.7	60.12	75.6	18.23	74.1
June 9.3	15.31 24	59.1 13	15.11 7	61.4 7	59.98 14	76.9 13	17.85 38	75.9 18
19.3	15.05 26	60.0 9	15.03 8	62.1 7	59.83 15	77.9 10	17.41 44	77.2 13
29.3	14.78 27	60.4 4	14.94 9	62.7 6	59.68 15	78.6 7	16.93 48	78.1 9
July 9.2	14.51 27 27	60.4 0 5	14.85 9 10	63.3 6 5	59.52 16 16	78.9 3 1	16.43 50 51	78.5 4 2
19.2	14.24	59.9	14.75	63.8	59.36	78.8	15.92	78.3
29.2	13.98 26	58.9 10	14.65 10	64.2 4	59.21 15	78.3 5	15.41 51	77.6 7
Aug. 8.2	13.75 23	57.4 15	14.56 9	64.4 2	59.07 14	77.4 9	14.92 49	76.4 12
18.1	13.54 21	55.5 19	14.48 8	64.5 1	58.94 13	76.1 13	14.47 45	74.8 16
28.1	13.36 18 14	53.2 23 27	14.41 7 5	64.5 0 2	58.83 11 8	74.5 16 19	14.09 38 31	72.8 20 24
Sept. 7.1	13.22	50.5	14.36	64.3	58.75	72.6	13.78	70.4
17.0	13.12 10	47.5 30	14.34 2	63.9 4	58.70 5	70.3 23	13.57 21	67.8 26
27.0	13.08 4	44.3 32	14.35 1	63.3 6	58.69 1	67.8 25	13.48 9	65.0 28
Oct. 7.0	13.10 2	40.9 34	14.40 5	62.4 9	58.72 3	65.1 27	13.51 3	62.2 28
17.0	13.19 9 15	37.3 36 37	14.49 9 13	61.3 11 14	58.80 8 14	62.1 30 31	13.67 16 29	59.4 28 25
26.9	13.34	33.6	14.62	59.9	58.94	59.0	13.96	56.9
Nov. 5.9	13.56 22	30.0 36	14.80 18	58.3 16	59.13 19	55.8 32	14.38 42	54.7 22
15.9	13.85 29	26.5 35	15.02 22	56.5 18	59.37 24	52.6 32	14.92 54	52.9 18
25.9	14.21 36	23.1 34	15.28 26	54.5 20	59.66 29	49.5 31	15.57 65	51.6 13
Dec. 5.8	14.63 42 46	20.0 31 27	15.57 29 32	52.3 22 23	59.99 33 36	46.5 30 27	16.30 73 79	50.8 8 2
15.8	15.09	17.3	15.89	50.0	60.35	43.8	17.09	50.6
25.8	15.58 49	15.1 22	16.23 34	47.7 23	60.73 38	41.4 24	17.91 82	51.0 4
35.7	16.09 51	13.5 16	16.57 34	45.5 22	61.13 40	39.4 20	18.74 83	52.0 10
Sec δ, Tan δ	1.808	+1.507	1.002	+0.068	1.283	+0.804	3.084	-2.918
Mean Place	12°.343	54''.77	13°.225	72''.21	57°.614	76''.91	15°.966	47''.27
D'ψ α, Dω α	-0.01	+0.10	0.00	0.00	0.00	+0.05	+0.02	-0.19
Dψ δ, Dω δ	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2	-0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Virginis. Mag. 3.0		θ Virginis. Mag. 4.4		43 Comae. Mag. 4.3		20 Canum Venat. Mag. 4.7	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 12 57	° ' +11 25	h m 13 5	° ' - 5 4	h m 13 7	° ' +28 18	h m 13 13	° ' +41 1
	s	"	s	"	s	"	s	"
Jan. 0.8	50.66	28.6	26.31	30.6	48.91	55.5	38.77	33.2
10.7	51.01 35	26.5 21	26.65 34	32.8 22	49.27 36	53.5 20	39.17 40	31.3 19
20.7	51.34 33	24.6 19	26.98 33	34.9 21	49.63 36	51.9 16	39.57 40	30.0 13
30.7	51.65 31	23.0 16	27.30 32	36.9 20	49.97 34	50.8 11	39.96 39	29.2 8
Feb. 9.7	51.94 29	21.8 12	27.59 29	38.7 18	50.29 32	50.2 6	40.32 36	28.9 3
	26	9	26	16	28	2	32	3
19.6	52.20	20.9	27.85	40.3	50.57	50.0	40.64	29.2
Mar. 1.6	52.42 22	20.4 5	28.07 22	41.6 13	50.81 24	50.3 3	40.91 27	30.0 8
11.6	52.60 18	20.2 2	28.25 18	42.7 11	51.01 20	51.0 7	41.14 23	31.3 13
21.5	52.74 14	20.4 2	28.40 15	43.5 8	51.17 16	52.1 11	41.32 18	33.0 17
31.5	52.84 10	20.8 4	28.52 12	44.1 6	51.28 11	53.5 14	41.45 13	34.9 19
	7	6	8	3	7	16	8	21
Apr. 10.5	52.91	21.4 8	28.60	44.4	51.35	55.1	41.53	37.0
20.5	52.94 3	22.2 10	28.65 5	44.5 1	51.39 4	56.8 17	41.56 3	39.3 23
30.4	52.95 1	23.2 10	28.67 2	44.5 0	51.39 0	58.6 18	41.55 1	41.6 23
May 10.4	52.93 2	24.2 10	28.66 1	44.3 2	51.36 3	60.4 18	41.50 5	43.8 22
20.4	52.89 4	25.2 10	28.64 2	44.0 3	51.31 5	62.1 17	41.42 8	45.8 20
	6	10	4	4	8	15	11	18
30.4	52.83	26.2	28.60	43.6	51.23	63.6	41.31	47.6
June 9.3	52.76 7	27.1 9	28.54 6	43.2 4	51.14 9	64.9 13	41.18 13	49.2 16
19.3	52.68 8	27.9 8	28.47 7	42.7 5	51.03 11	66.0 11	41.03 15	50.4 12
29.3	52.58 10	28.6 7	28.38 9	42.2 5	50.91 12	66.9 9	40.87 16	51.2 8
July 9.2	52.48 10	29.1 5	28.28 10	41.6 6	50.78 13	67.4 5	40.70 17	51.6 4
	10	4	10	6	13	2	17	1
19.2	52.38	29.5	28.18	41.0	50.65	67.6	40.53	51.7
29.2	52.28 10	29.8 3	28.08 10	40.5 5	50.52 13	67.5 1	40.35 18	51.3 4
Aug. 8.2	52.18 10	29.9 1	27.99 9	40.0 5	50.39 13	67.1 4	40.18 17	50.5 8
18.1	52.09 9	29.7 2	27.90 9	39.6 4	50.27 12	66.4 7	40.03 15	49.3 12
28.1	52.01 8	29.3 4	27.82 8	39.2 4	50.17 10	65.4 10	39.89 14	47.8 15
	5	6	6	2	8	14	11	19
Sept. 7.1	51.96	28.7 8	27.76	39.0	50.09	64.0	39.78	45.9
17.1	51.93 3	27.9 11	27.73 3	38.9 1	50.03 6	62.3 17	39.70 8	43.6 23
27.0	51.93 0	26.8 13	27.73 0	39.0 1	50.01 2	60.3 20	39.66 4	41.0 26
Oct. 7.0	51.97 4	25.5 16	27.76 3	39.3 3	50.03 2	58.1 22	39.66 0	38.2 28
17.0	52.05 8	23.9 18	27.84 8	39.9 6	50.09 6	55.7 24	39.71 5	35.2 30
	13	18	12	8	11	26	10	32
26.9	52.18	22.1	27.96	40.7	50.20	53.1	39.81	32.0
Nov. 5.9	52.35 17	20.1 20	28.13 17	41.8 11	50.36 16	50.3 28	39.97 16	28.7 33
15.9	52.56 21	17.9 22	28.35 22	43.2 14	50.57 21	47.4 29	40.19 22	25.4 33
25.9	52.82 26	15.6 23	28.60 25	44.8 16	50.82 25	44.5 29	40.46 27	22.1 33
Dec. 5.8	53.11 29	13.2 24	28.89 29	46.6 18	51.12 30	41.7 28	40.77 31	19.0 31
	32	24	32	20	33	27	35	29
15.8	53.43	10.8	29.21	48.6	51.45	39.0	41.12	16.1
25.8	53.77 34	8.5 23	29.55 34	50.7 21	51.80 35	36.5 25	41.50 38	13.5 26
35.8	54.11 34	6.2 23	29.89 34	52.8 21	52.16 36	34.3 22	41.91 41	11.4 21
Sec δ, Tan δ	1.020	+0.202	1.004	-0.089	1.136	+0.539	1.326	+0.870
Mean Place	50°.768	35''.54	26°.622	29''.18	48°.908	68''.22	38°.665	49''.62
D'φ α, Dα α	0.00	+0.01	0.00	-0.01	0.00	+0.03	-0.01	+0.06
Dφ δ, Dα δ	-0.4	-0.2	-0.4	-0.3	-0.4	-0.3	-0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Hydræ. Mag. 3.3			ι Centauri. Mag. 2.9			ζ^1 Ursæ Majoris. Mag. 2.4			α Virginis. Mag. 1.2		
	Right Ascension.		Declination S.	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination S.
	h m	s	° ' "	h m	s	° ' "	h m	s	° ' "	h m	s	° ' "
	13	14	-22 42	13	15	-36 15	13	20	+55 22	13	20	-10 42
Jan. 0.8	10.75		41.6	41.24		4.6	25.81		26.4	36.00		26.8
10.7	11.11	36	43.7 21	41.64	40	6.4 18	26.31	50	24.7 17	36.35	35	28.9 21
20.7	11.47	36	45.8 21	42.03	39	8.5 21	26.81	50	23.6 11	36.69	34	31.0 21
30.7	11.81	34	48.0 22	42.40	37	10.8 23	27.29	48	23.1 5	37.01	32	33.0 20
Feb. 9.7	12.12	31	50.2 22	42.74	34	13.3 25	27.74	45	23.2 1	37.31	30	35.0 20
		28			31			40	8		27	18
19.6	12.40		52.4	43.05		15.8	28.14		24.0	37.58		36.8
Mar. 1.6	12.64	24	54.5 21	43.32	27	18.4 26	28.49	35	25.3 13	37.82	24	38.4 16
		20	56.4 19	43.54	22	20.9 25	28.78	29	27.1 18	38.02	20	39.7 13
11.6	12.84	17	58.2 18	43.72	18	23.3 24	29.00	22	29.3 22	38.19	17	40.8 11
21.6	13.01	13	59.8 16	43.86	14	25.6 23	29.16	16	31.8 25	38.32	13	41.7 9
31.5	13.14	10			11	22		9	27		10	7
Apr. 10.5	13.24		61.2	43.97		27.8	29.25		34.5	38.42		42.4
20.5	13.30	6	62.4 12	44.04	7	29.8 20	29.27	2	37.2 27	38.48	6	42.9 5
30.4	13.33	3	63.4 10	44.07	3	31.6 18	29.23	4	39.9 27	38.52	4	43.1 2
May 10.4	13.34	1	64.2 8	44.07	0	33.1 15	29.14	9	42.5 26	38.53	1	43.2 1
20.4	13.32	2	64.8 6	44.04	3	34.4 13	29.00	14	44.8 23	38.52	1	43.2 0
		4			5	10		18	20		3	1
30.4	13.28		65.2	43.99		35.4	28.82		46.8	38.49		43.1
June 9.3	13.22	6	65.4 2	43.91	8	36.1 7	28.61	21	48.4 16	38.44	5	42.8 3
		8			10			23	13		7	4
19.3	13.14	10	65.4 0	43.81	12	36.5 4	28.38	26	49.7 8	38.37	8	42.4 4
29.3	13.04	10	65.2 2	43.69	14	36.6 1	28.12	27	50.5 3	38.29	10	42.0 4
July 9.3	12.94	11	64.8 4	43.55	14	36.5 1	27.85	27	50.8 2	38.19	10	41.5 5
			5		14	4		27			10	5
19.2	12.83		64.3	43.41		36.1	27.58		50.6	38.09		41.0
29.2	12.71	12	63.6 7	43.26	15	35.4 7	27.31	27	50.0 6	37.99	10	40.4 6
Aug. 8.2	12.59	12	62.7 9	43.11	15	34.4 10	27.05	26	48.9 11	37.88	11	39.8 6
		11	61.8 9	42.97	14	33.2 12	26.81	24	47.3 16	37.78	10	39.2 6
18.1	12.48	9	60.8 10	42.85	12	31.8 14	26.59	22	45.3 20	37.69	9	38.7 5
28.1	12.39	8			10	15		18	24		7	5
Sept. 7.1	12.31		59.8	42.75		30.3	26.41		42.9	37.62		38.2
17.1	12.26	5	58.9 9	42.68	7	28.7 16	26.27	14	40.1 28	37.57	5	37.8 4
27.0	12.25	1	58.0 9	42.66	2	27.2 15	26.18	9	37.0 31	37.55	2	37.6 2
Oct. 7.0	12.28	3	57.3 7	42.68	2	25.8 14	26.14	4	33.7 33	37.57	2	37.6 0
17.0	12.36	8	56.8 5	42.76	8	24.5 13	26.17	3	30.2 35	37.64	7	37.8 2
		12			13	11		9	37		11	4
27.0	12.48		56.5	42.89		23.4	26.26		26.5	37.75		38.2
Nov. 5.9	12.65	17	56.5 0	43.08	19	22.7 7	26.42	16	22.8 37	37.91	16	38.9 7
		22	56.9 4	43.33	25	22.3 4	26.65	23	19.1 37	38.11	20	39.9 10
15.9	12.87	27	57.6 7	43.63	30	22.3 0	26.95	30	15.6 35	38.36	25	41.2 13
25.9	13.14	31	58.6 10	43.97	34	22.7 4	27.32	37	12.3 33	38.64	28	42.8 16
Dec. 5.8	13.45	34			37	8		42	29		32	18
15.8	13.79		60.0	44.34		23.5	27.74		9.4	38.96		44.6
25.8	14.15	36	61.6 16	44.73	39	24.8 13	28.20	46	6.9 25	39.30	34	46.5 19
35.8	14.51	36	63.5 19	45.13	40	26.4 16	28.68	48	4.8 21	39.64	34	48.5 20
Sec δ , Tan δ	1.084		-0.419	1.240		-0.733	1.760		+1.448	1.018		-0.189
Mean Place	11 ^h .316		45 ^m .99	42 ^h .018		13 ^m .18	25 ^h .561		46 ^m .08	36 ^h .462		26 ^m .80
D ψ α , D ω α	0.00		-0.03	+0.01		-0.05	-0.01		+0.09	0.00		-0.01
D ψ δ , D ω δ	-0.4		-0.3	-0.4		-0.3	-0.4		-0.3	-0.4		-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombridge 2001. Mag. 6.1		70 Virginis. Mag. 5.2		κ Octantis. Mag. 5.6		ζ Virginis. Mag. 3.4	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 13 23 s	° ' +72 49 "	h m 13 24 s	° ' +14 14 "	h m 13 26 s	° ' -85 20 "	h m 13 30 s	° ' - 0 9 "
Jan. 0.8	55.58	72.9	10.25	26.6	28.01	10.4	15.11	9.0
10.8	56.41 83	71.5 14	10.59 34	24.4 22	31.02 301	11.0 6	15.45 34	11.1 21
20.7	57.26 85	70.7 8	10.93 34	22.5 19	33.98 296	12.2 12	15.78 33	13.1 20
30.7	58.09 83	70.6 1	11.26 33	20.9 16	36.83 285	13.9 17	16.10 32	15.0 19
Feb. 9.7	58.87 78	71.2 6	11.57 31	19.7 12	39.49 266	16.2 23	16.40 30	16.6 16
	71	12	27	8	241	27	28	14
19.6	59.58	72.4	11.84	18.9	41.90	18.9	16.68	18.0
Mar. 1.6	60.19 61	74.2 18	12.08 24	18.4 5	44.02 212	22.0 31	16.92 24	19.1 11
11.6	60.69 50	76.5 23	12.28 20	18.3 1	45.80 178	25.4 34	17.13 21	19.9 8
21.6	61.07 38	79.1 26	12.45 17	18.6 3	47.21 141	29.0 36	17.30 17	20.4 5
31.5	61.31 24	82.0 29	12.58 13	19.1 5	48.24 103	32.8 38	17.44 14	20.7 3
	10	30	9	8	64	38	10	0
Apr. 10.5	61.41	85.0	12.67	19.9	48.88	36.6	17.54	20.7
20.5	61.38 3	88.0 30	12.73 6	20.9 10	49.11 23	40.4 38	17.61 7	20.5 2
30.5	61.23 15	91.0 30	12.76 3	22.0 11	48.94 17	44.1 37	17.65 4	20.2 3
May 10.4	60.96 27	93.7 27	12.76 0	23.2 12	48.39 55	47.6 35	17.67 2	19.7 5
20.4	60.60 36	96.1 24	12.74 2	24.4 12	47.47 92	50.8 32	17.66 1	19.1 6
	45	21	4	12	127	29	3	6
30.4	60.15	98.2	12.70	25.6	46.20	53.7	17.63	18.5
June 9.3	59.63 52	99.8 16	12.64 6	26.7 11	44.60 160	56.3 26	17.58 5	17.9 6
19.3	59.06 57	100.9 11	12.56 8	27.6 9	42.72 188	58.4 21	17.52 6	17.2 7
29.3	58.45 61	101.5 6	12.46 10	28.4 8	40.63 209	60.0 16	17.44 8	16.6 6
July 9.3	57.82 63	101.5 0	12.36 10	29.0 6	38.37 226	61.0 10	17.35 9	16.0 6
	63	5	11	5	235	5	10	5
19.2	57.19	101.0	12.25	29.5	36.02	61.5	17.25	15.5
29.2	56.57 62	100.0 10	12.14 11	29.8 3	33.63 239	61.4 1	17.14 11	15.0 5
Aug. 8.2	55.97 60	98.5 15	12.03 11	29.8 0	31.30 233	60.8 6	17.03 11	14.6 4
18.2	55.41 56	96.5 20	11.92 11	29.6 2	29.11 219	59.6 12	16.93 10	14.3 3
28.1	54.91 50	94.0 25	11.82 10	29.1 5	27.13 198	57.9 17	16.84 9	14.2 1
	44	28	8	7	169	21	8	0
Sept. 7.1	54.47	91.2	11.74	28.4	25.44	55.8	16.76	14.2
17.1	54.12 35	88.0 32	11.69 5	27.5 9	24.12 132	53.3 25	16.70 6	14.3 1
27.0	53.86 26	84.5 35	11.67 2	26.3 12	23.23 89	50.5 28	16.68 2	14.7 4
Oct. 7.0	53.70 16	80.8 37	11.68 1	24.8 15	22.82 41	47.5 30	16.69 1	15.3 6
17.0	53.66 4	76.9 39	11.73 5	23.1 17	22.91 9	44.5 30	16.74 5	16.1 8
	9	39	10	19	61	30	10	11
27.0	53.75	73.0	11.83	21.2	23.52	41.5	16.84	17.2
Nov. 5.9	53.96 21	69.1 39	11.97 14	19.1 21	24.65 113	38.7 28	16.98 14	18.5 13
15.9	54.29 33	65.3 38	12.16 19	16.7 24	26.26 161	36.2 25	17.17 19	20.1 16
25.9	54.75 46	61.7 36	12.39 23	14.2 25	28.30 204	34.1 21	17.40 23	21.9 18
Dec. 5.9	55.33 58	58.4 33	12.66 27	11.7 25	30.70 240	32.5 16	17.67 27	23.8 19
	67	28	31	25	270	10	30	21
15.8	56.00	55.6	12.97	9.2	33.40	31.5	17.97	25.9
25.8	56.75 75	53.3 23	13.30 33	6.7 25	36.30 290	31.1 4	18.30 33	28.1 22
35.8	57.56 81	51.5 18	13.64 34	4.4 23	39.30 300	31.2 1	18.63 33	30.3 22
Sec δ, Tan δ	3.389	+3.238	1.031	+0.254	12.318	-12.277	1.000	-0.003
Mean Place	54°.818	94''.83	10°.491	35''.39	38°.29*	27''.65	15°.517	4''.89
D'α, Dα α	-0.03	+0.20	0.00	+0.02	+0.12	-0.76	0.00	0.00
Dδ, Dα δ	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	17 H. Canum Venat. Mag. 5.0		ε Centauri. Mag. 2.6		m Virginis. Mag. 5.2		τ Boötis. Mag. 4.5	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 13 30 s	° ' +37 37 "	h m 13 34 s	° ' -53 1 "	h m 13 37 s	° ' - 8 15 "	h m 13 43 s	° ' +17 52 "
Jan. 0.8	54.77	24.5	20.64	16.1	2.09	53.1	7.33	73.3
10.8	55.16 39	22.5 20	21.15 51	17.4 13	2.43 34	55.1 20	7.68 35	71.1 12
20.7	55.55 39	20.9 16	21.65 50	19.1 17	2.77 34	57.2 21	8.03 35	69.2 19
30.7	55.93 38	19.8 11	22.13 48	21.2 21	3.10 33	59.2 20	8.36 33	67.6 16
Feb. 9.7	56.28 35 32	19.3 5 0	22.58 45 40	23.6 24 27	3.41 31 28	61.0 18 16	8.67 31 29	66.4 12 7
19.7	56.60	19.3 6	22.98	26.3	3.69	62.6	8.96	65.7
Mar. 1.6	56.88 28	19.9 11	23.34 36	29.1 28	3.94 25	64.0 14	9.22 26	65.4 3
11.6	57.12 24	21.0 14	23.65 31	32.0 29	4.15 21	65.2 12	9.44 22	65.5 1
21.6	57.31 19	22.4 18	23.91 26	35.0 30	4.33 18	66.2 10	9.62 18	65.9 4
31.5	57.46 15 10	24.2 20	24.12 21 15	38.0 30 29	4.48 15 11	67.0 8 5	9.77 15 11	66.7 8 10
Apr. 10.5	57.56 6	26.2 22	24.27 10	40.9 28	4.59 8	67.5 3	9.88 8	67.7 12
20.5	57.62 1	28.4 22	24.37 6	43.7 26	4.67 5	67.8 1	9.96 4	68.9 14
30.5	57.63 3	30.6 21	24.43 1	46.3 24	4.72 3	67.9 0	10.00 2	70.3 14
May 10.4	57.60 6	32.7 21	24.44 3	48.7 21	4.75 0	67.9 2	10.02 1	71.7 14
20.4	57.54 8	34.8 19	24.41 8	50.8 19	4.75 2	67.7 3	10.01 3	73.1 14
30.4	57.46 11	36.7 16	24.33 11	52.7 15	4.73 4	67.4 4	9.98 6	74.5 13
June 9.4	57.35 13	38.3 13	24.22 15	54.2 11	4.69 6	67.0 4	9.92 8	75.8 11
19.3	57.22 14	39.6 10	24.07 18	55.3 8	4.63 7	66.6 4	9.84 9	76.9 10
29.3	57.08 15	40.6 6	23.89 21	56.1 4	4.56 9	66.2 5	9.75 10	77.9 8
July 9.3	56.93 16	41.2 3	23.68 22	56.5 0	4.47 10	65.7 6	9.65 12	78.7 5
19.2	56.77 17	41.5 1	23.46 23	56.5 5	4.37 11	65.1 5	9.53 12	79.2 3
29.2	56.60 17	41.4 6	23.23 24	56.0 9	4.26 11	64.6 5	9.41 13	79.5 0
Aug. 8.2	56.43 16	40.8 9	22.99 23	55.1 12	4.15 11	64.1 5	9.28 12	79.5 2
18.2	56.27 14	39.9 13	22.76 21	53.9 15	4.04 10	63.6 5	9.16 11	79.3 5
28.1	56.13 12	38.6 17	22.55 17	52.4 18	3.94 8	63.1 4	9.05 10	78.8 8
Sept. 7.1	56.01 9	36.9 20	22.38 13	50.6 20	3.86 6	62.7 2	8.95 8	78.0 10
17.1	55.92 6	34.9 23	22.25 8	48.6 22	3.80 3	62.5 0	8.87 5	77.0 13
27.1	55.86 1	32.6 26	22.17 1	46.4 22	3.77 0	62.5 1	8.82 1	75.7 16
Oct. 7.0	55.85 3	30.0 29	22.16 6	44.2 21	3.77 5	62.6 3	8.81 3	74.1 19
17.0	55.88 8	27.1 31	22.22 13	42.1 20	3.82 9	62.9 6	8.84 8	72.2 21
27.0	55.96 13	24.0 32	22.35 21	40.1 17	3.91 14	63.5 8	8.92 12	70.1 23
Nov. 5.9	56.09 19	20.8 33	22.56 28	38.4 14	4.05 19	64.3 11	9.04 17	67.8 25
15.9	56.28 24	17.5 32	22.84 35	37.0 10	4.24 23	65.4 14	9.21 22	65.3 26
25.9	56.52 29	14.3 31	23.19 41	36.0 5	4.47 27	66.8 16	9.43 26	62.7 27
Dec. 5.9	56.81 33	11.2 30	23.60 45	35.5 0	4.74 31	68.4 18	9.69 29	60.0 26
15.8	57.14 36	8.2 27	24.05 49	35.5 5	5.05 33	70.2 19	9.98 32	57.4 25
25.8	57.50 39	5.5 23	24.54 51	36.0 10	5.38 34	72.1 20	10.30 34	54.9 24
35.8	57.89	3.2	25.05	37.0	5.72	74.1	10.64	52.5
Sec δ, Tan δ	1.263	+0.771	1.663	-1.328	1.011	-0.145	1.051	+0.323
Mean Place	54°.845	40'' .50	22°.008	28'' .29	2°.620	51'' .60	7°.667	83'' .87
D'ψ a, Dω a	-0.01	+0.05	+0.01	-0.08	0.00	-0.01	0.00	+0.02
Dψ δ, Dω δ	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Ursæ Majoris. Mag. 1.9		89 Virginis. Mag. 5.1		ζ Centauri. Mag. 3.1		γ Boötis. Mag. 2.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 13 44	° ' +49 44	h m 13 45	° ' -17 42	h m 13 50	° ' -46 51	h m 13 50	° ' +18 49
Jan. 0.8	6.80	30.6	7.79	2.7	5.05	28.2	32.17	49.4
10.8	7.24 44	28.6 20	8.14 35	4.6 19	5.50 45	29.5 13	32.51 34	47.1 23
20.7	7.68 44	27.1 15	8.49 35	6.6 20	5.96 46	31.1 16	32.86 35	45.2 19
30.7	8.12 44	26.2 9	8.83 34	8.6 20	6.40 44	33.1 20	33.20 34	43.6 16
Feb. 9.7	8.54 42 38	25.9 3 4	9.15 32 30	10.6 20 19	6.82 42 38	35.3 22 24	33.52 32 29	42.4 12 8
19.7	8.92	26.3	9.45	12.5	7.20	37.7	33.81	41.6
Mar. 1.6	9.26 34	27.2 9	9.71 26	14.3 18	7.54 34	40.3 26	34.07 26	41.3 3
11.6	9.55 29	28.7 15	9.94 23	15.9 16	7.84 30	42.9 26	34.30 23	41.4 1
21.6	9.79 24	30.6 19	10.13 19	17.3 14	8.10 26	45.6 27	34.49 19	41.9 5
31.6	9.97 18 12	32.8 22 24	10.29 16 13	18.5 12 11	8.32 22 17	48.2 26 26	34.65 16 12	42.7 8 11
Apr. 10.5	10.09 6	35.2 26	10.42 9	19.6 9	8.49 12	50.8 25	34.77 9	43.8 13
20.5	10.15 1	37.8 27	10.51 6	20.5 7	8.61 8	53.3 23	34.86 5	45.1 14
30.5	10.16 4	40.5 26	10.57 4	21.2 5	8.69 4	55.6 21	34.91 2	46.5 15
May 10.4	10.12 9 12	43.1 24 22	10.61 1 1	21.7 3 2	8.73 0 4	57.7 19 16	34.93 1 3	48.0 15 14
20.4	10.03	45.5	10.62	22.0	8.73	59.6	34.92	49.5
30.4	9.91	47.7	10.61	22.2	8.69	61.2	34.89	50.9
June 9.4	9.76 15	49.6 19	10.57 4	22.2 0	8.62 7	62.6 14	34.84 5	52.2 13
19.3	9.58 18	51.1 15	10.51 6	22.1 1	8.52 10	63.7 11	34.77 7	53.4 12
29.3	9.37 21	52.2 11	10.44 7	21.9 2	8.38 14	64.4 7	34.68 9	54.4 10
July 9.3	9.15 22 23	52.8 6 2	10.35 9 11	21.6 3 4	8.22 16 18	64.7 3 0	34.68 11 12	54.4 8 6
19.2	8.92	53.0	10.24	21.2	8.04	64.7	34.45	55.8
29.2	8.69 23	52.8 2	10.12 12	20.6 6	7.84 20	64.3 4	34.33 12	56.1 3
Aug. 8.2	8.45 24	52.1 7	10.00 12	20.0 6	7.64 20	63.6 7	34.20 13	56.1 0
18.2	8.22 23	50.9 12	9.89 11	19.3 7	7.45 19	62.6 10	34.08 12	55.9 2
28.1	8.01 21 18	49.3 16 20	9.78 11 10	18.6 7 7	7.27 18 16	61.3 13 16	33.96 12 10	55.4 5 8
Sept. 7.1	7.83	47.3	9.68	17.9	7.11	59.7	33.86	54.6
17.1	7.68 15	44.9 24	9.61 7	17.2 7	6.98 13	57.9 18	33.78 8	53.5 11
27.1	7.57 11	42.2 27	9.57 4	16.6 6	6.90 8	56.1 18	33.72 6	52.1 14
Oct. 7.0	7.51 6	39.1 31	9.57 0	16.1 5	6.87 3	54.2 19	33.70 2	50.5 16
17.0	7.50 1 5	35.8 33 35	9.61 4 9	15.9 2 0	6.91 4 10	52.4 18 17	33.72 2 7	48.6 19 22
27.0	7.55	32.3	9.70	15.9	7.01	50.7	33.79	46.4
Nov. 5.9	7.67 12	28.7 36	9.84 14	16.2 3	7.18 17	49.2 15	33.90 11	44.0 24
15.9	7.85 18	25.1 36	10.03 19	16.7 5	7.42 24	48.0 12	34.06 16	41.5 25
25.9	8.10 25	21.5 36	10.26 23	17.5 8	7.72 30	47.2 8	34.27 21	38.9 26
Dec. 5.9	8.41 31 35	18.1 34 31	10.54 28 31	18.6 11 14	8.08 36 40	46.9 3 1	34.53 26 29	36.2 27 27
15.8	8.76	15.0	10.85	20.0	8.48	47.0	34.82	33.5
25.8	9.16 40	12.2 28	11.19 34	21.6 16	8.91 43	47.5 5	35.14 32	30.9 26
35.8	9.59 43	9.8 24	11.54 35	23.4 18	9.37 46	48.4 9	35.47 33	28.5 24
Sec δ, Tan δ	1.547	+1.181	1.050	-0.319	1.463	-1.067	1.057	+0.341
Mean Place	6 ^h .869	49 ^m .70	8 ^h .470	4 ^m .08	6 ^h .321	38 ^m .05	32 ^h .541	60 ^m .44
D _α α, D _α α	-0.01	+0.06	0.00	-0.02	+0.01	-0.06	0.00	+0.02
D _δ δ, D _δ δ	-0.4	-0.4	-0.4	-0.4	-0.4	-0.5	-0.4	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Apodis. Var. 5.5–6.6		τ Virginis. Mag. 4.3		11 Boötis. Mag. 6.1		β Cent Mag.
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.
	h m 13 56 s	° ' –76 22 "	h m 13 57 s	° ' + 1 57 "	h m 13 57 s	° ' +27 47 "	h m 13 57 s
Jan. 0.8	44.57	24.0	12.52	48.9	13.49	69.0	38.49
10.8	45.69 ¹¹²	24.3 3	12.85 33	46.7 ²²	13.85 ³⁶	66.8 ²²	39.07 ⁵⁸
20.7	46.82 ¹¹³	25.3 10	13.19 34	44.7 ²⁰	14.21 ³⁶	64.9 ¹⁹	39.66 ⁵⁹
30.7	47.92 ¹¹⁰	26.8 15	13.52 33	42.9 ¹⁸	14.56 ³⁵	63.4 ¹⁵	40.24 ⁵⁸
Feb. 9.7	48.97 ¹⁰⁵	28.7 19	13.83 31	41.3 ¹⁶	14.90 ³⁴	62.4 ¹⁰	40.78 ⁵⁴
	98	24	29	13	31	5	50
19.7	49.95	31.1	14.12	40.0	15.21	61.9	41.28
Mar. 1.6	50.84 ⁸⁹	33.9 28	14.38 26	39.0 ¹⁰	15.49 ²⁸	61.9 0	41.74 ⁴⁶
11.6	51.62 ⁷⁸	37.0 31	14.61 23	38.3 7	15.73 ²⁴	62.4 5	42.15 ⁴¹
21.6	52.28 ⁶⁶	40.3 33	14.80 19	37.9 4	15.93 ²⁰	63.3 9	42.49 ³⁴
31.6	52.81 ⁵³	43.8 35	14.96 16	37.8 1	16.10 ¹⁷	64.6 ¹³	42.77 ²⁸
	40	35	13	2	13	15	23
Apr. 10.5	53.21	47.3	15.09	38.0	16.23	66.1	43.00
20.5	53.48 ²⁷	50.9 36	15.19 ¹⁰	38.3 3	16.32 9	67.9 ¹⁸	43.17 ¹⁷
30.5	53.62 ¹⁴	54.4 35	15.26 7	38.8 5	16.37 5	69.8 ¹⁹	43.27 ¹⁰
May 10.4	53.62 ⁰	57.7 33	15.30 4	39.4 6	16.39 2	71.7 ¹⁹	43.31 ⁴
20.4	53.49 ¹³	60.8 31	15.32 2	40.1 7	16.38 1	73.6 ¹⁹	43.30 ¹
	26	29	1	8	4	18	7
30.4	53.23	63.7	15.31	40.9	16.34	75.4	43.23
June 9.4	52.85 ³⁸	66.2 25	15.28 3	41.7 8	16.28 6	77.0 ¹⁶	43.11 ¹²
19.3	52.37 ⁴⁸	68.3 21	15.23 5	42.5 8	16.19 9	78.4 ¹⁴	42.94 ¹⁷
29.3	51.79 ⁵⁸	70.0 17	15.16 7	43.2 7	16.08 ¹¹	79.5 ¹¹	42.73 ²¹
July 9.3	51.13 ⁶⁶	71.2 12	15.07 9	43.8 6	15.96 ¹²	80.4 9	42.48 ²⁵
	71	7	10	6	14	6	28
19.3	50.42	71.9	14.97	44.4	15.82	81.0	42.20
29.2	49.68 ⁷⁴	72.0 1	14.86 ¹¹	44.9 5	15.68 ¹⁴	81.3 3	41.90 ³⁰
Aug. 8.2	48.93 ⁷⁵	71.6 4	14.74 ¹²	45.3 4	15.53 ¹⁵	81.2 1	41.59 ³¹
18.2	48.19 ⁷⁴	70.7 9	14.63 ¹¹	45.5 2	15.39 ¹⁴	80.8 4	41.29 ³⁰
28.1	47.50 ⁶⁹	69.3 14	14.52 ¹¹	45.6 1	15.25 ¹⁴	80.0 8	41.01 ²⁸
	61	18	10	1	13	11	25
Sept. 7.1	46.89	67.5	14.42	45.5	15.12	78.9	40.76
17.1	46.39 ⁵⁰	65.2 23	14.35 7	45.2 3	15.02 ¹⁰	77.4 ¹⁵	40.56 ²⁰
27.1	46.03 ³⁶	62.6 26	14.30 5	44.8 4	14.95 7	75.6 ¹⁸	40.42 ¹⁴
Oct. 7.0	45.82 ²¹	59.8 28	14.28 2	44.1 7	14.91 4	73.5 ²¹	40.35 ⁷
17.0	45.78 ⁴	57.0 28	14.30 2	43.2 9	14.92 1	71.2 ²³	40.36 ¹
	14	28	7	12	5	26	11
27.0	45.92	54.2	14.37	42.0	14.97	68.6	40.47
Nov. 6.0	46.26 ³⁴	51.5 27	14.49 ¹²	40.6 ¹⁴	15.07 ¹⁰	65.8 ²⁸	40.67 ²⁰
15.9	46.78 ⁵²	49.0 25	14.65 ¹⁶	39.0 ¹⁶	15.23 ¹⁶	62.9 ²⁹	40.96 ²⁹
25.9	47.46 ⁶⁸	46.9 21	14.86 ²¹	37.1 ¹⁹	15.44 ²¹	59.9 ³⁰	41.33 ³⁷
Dec. 5.9	48.29 ⁸³	45.2 17	15.11 ²⁵	35.1 ²⁰	15.69 ²⁵	56.9 ³⁰	41.77 ⁴⁴
	95	12	29	21	29	29	50
15.8	49.24	44.0	15.40	33.0	15.98	54.0	42.27
25.8	50.29 ¹⁰⁵	43.4 6	15.71 ³¹	30.8 ²²	16.30 ³²	51.3 ²⁷	42.82 ⁵⁵
35.8	51.39 ¹¹⁰	43.5 1	16.04 ³³	28.6 ²²	16.65 ³⁵	48.8 ²⁵	43.40 ⁵⁸
Sec δ , Tan δ	4.247	–4.127	1.001	+0.034	1.131	+0.527	1.997
Mean Place	48°.740	38''.74	13°.063	54''.58	13°.843	82''.91	40°.409
D' ψ a , D ω a	+0.05	–0.24	0.00	0.00	–0.01	+0.03	+0.02
D ψ δ , D ω δ	–0.3	–0.5	–0.3	–0.5	–0.3	–0.5	–0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π Hydræ. Mag. 3.5		θ Centauri. Mag. 2.3		α Draconis. Mag. 3.6		d Boötis. Mag. 4.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 14 1	° ' -26 15	h m 14 1	° ' -35 56	h m 14 2	° ' +64 46	h m 14 6	° ' +25 29
	s	"	s	"	s	"	s	"
Jan. 0.8	23.91	46.0	32.37	26.3	1.90	67.4	25.49	58.5
10.8	24.28 37	47.7 17	32.77 40	27.7 14	2.49 59	65.4 20	25.84 35	56.2 23
20.8	24.65 37	49.5 18	33.17 40	29.4 17	3.10 61	64.0 14	26.19 35	54.2 20
30.7	25.01 36	51.4 19	33.56 39	31.3 19	3.71 61	63.2 8	26.54 35	52.6 16
Feb. 9.7	25.36 35	53.4 20	33.93 37	33.4 21	4.30 59	63.1 1	26.87 33	51.5 11
	32	20	34	22	55	6	31	6
19.7	25.68	55.4	34.27	35.6	4.85	63.7	27.18	50.9
Mar. 1.6	25.97 29	57.4 20	34.58 31	37.9 23	5.35 50	64.9 12	27.46 28	50.8 1
11.6	26.22 25	59.3 19	34.86 28	40.1 22	5.78 43	66.7 18	27.71 25	51.2 4
21.6	26.44 22	61.1 18	35.10 24	42.3 22	6.13 35	68.9 22	27.93 22	52.0 8
31.6	26.62 18	62.7 16	35.30 20	44.4 21	6.39 26	71.5 26	28.10 17	53.1 11
	15	15	16	20	17	28	13	14
Apr. 10.5	26.77	64.2	35.46	46.4	6.56	74.3	28.23	54.5
20.5	26.89 12	65.6 14	35.59 13	48.3 19	6.65 9	77.3 30	28.33 10	56.1 16
30.5	26.98 9	66.8 12	35.68 9	50.1 18	6.65 0	80.3 30	28.39 6	57.9 18
May 10.5	27.04 6	67.8 10	35.74 6	51.7 16	6.57 8	83.2 29	28.42 3	59.8 19
20.4	27.06 2	68.6 8	35.76 2	53.0 13	6.41 16	85.9 27	28.42 0	61.6 18
	0	6	1	11	22	24	2	18
30.4	27.06	69.2	35.75	54.1	6.19	88.3	28.40	63.4
June 9.4	27.03 3	69.6 4	35.71 4	55.0 9	5.91 28	90.4 21	28.35 5	65.0 16
19.3	26.98 5	69.9 3	35.64 7	55.7 7	5.58 33	92.1 17	28.27 8	66.4 14
29.3	26.90 8	70.0 1	35.55 9	56.1 4	5.21 37	93.3 12	28.17 10	67.6 12
July 9.3	26.80 10	69.9 1	35.43 12	56.3 2	4.81 40	94.0 7	28.06 11	68.5 9
	11	3	14	1	42	2	13	7
19.3	26.69	69.6	35.29	56.2	4.39	94.2	27.93	69.2
29.2	26.56 13	69.2 4	35.14 15	55.8 4	3.96 43	93.9 3	27.79 14	69.5 3
Aug. 8.2	26.43 13	68.6 6	34.98 16	55.2 6	3.54 42	93.0 9	27.64 15	69.5 0
18.2	26.30 13	67.8 8	34.82 16	54.3 9	3.13 41	91.7 13	27.50 14	69.2 3
28.2	26.17 13	66.9 9	34.67 15	53.3 10	2.74 39	89.9 18	27.36 14	68.6 6
	12	9	13	12	35	23	13	10
Sept. 7.1	26.05	66.0	34.54	52.1	2.39	87.6	27.23	67.6
17.1	25.96 9	65.0 10	34.43 11	50.8 13	2.08 31	84.9 27	27.13 10	66.3 13
27.1	25.90 6	64.1 9	34.36 7	49.4 14	1.83 25	81.8 31	27.05 8	64.7 16
Oct. 7.0	25.88 2	63.2 9	34.33 3	48.1 13	1.65 18	78.4 34	27.01 4	62.8 19
17.0	25.91 3	62.4 8	34.35 2	46.8 13	1.55 10	74.8 36	27.01 0	60.6 22
	8	6	8	11	1	38	4	25
27.0	25.99	61.8	34.43	45.7	1.54	71.0	27.05	58.1
Nov. 6.0	26.12 13	61.5 3	34.57 14	44.8 9	1.62 8	67.2 38	27.14 9	55.4 27
15.9	26.30 18	61.5 0	34.77 20	44.2 6	1.79 17	63.3 39	27.29 15	52.6 28
25.9	26.53 23	61.8 3	35.03 26	43.9 3	2.05 26	59.5 38	27.48 19	49.7 29
Dec. 5.9	26.81 28	62.4 6	35.33 30	44.0 1	2.40 35	55.9 36	27.72 24	46.7 30
	32	9	34	5	44	33	28	29
15.9	27.13	63.3	35.67	44.5	2.84	52.6	28.00	43.8
25.8	27.48 35	64.5 12	36.04 37	45.3 8	3.35 51	49.8 28	28.32 32	41.1 27
35.8	27.84 36	66.0 15	36.44 40	46.5 12	3.91 56	47.4 24	28.66 34	38.6 25
Sec δ , Tan δ	1.115	-0.494	1.235	-0.725	2.348	+2.124	1.108	+0.477
Mean Place	24°.806	49'".42	33°.440	32'".60	2°.056	89'".04	25°.915	71'".88
D' ϕ α , D ω α	+0.01	-0.03	+0.01	-0.04	-0.03	+0.12	-0.01	+0.03
D ϕ δ , D ω δ	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	κ Virginis. Mag. 4.3		4 Ursæ Minoris. Mag. 5.0		ι Virginis. Mag. 4.2		α Bootis. Mag. 0.2	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 14 8 s	° ' - 9 52 "	h m 14 9 s	° ' +77 56 "	h m 14 11 s	° ' - 5 35 "	h m 14 11 s	° ' +19 37 "
Jan. 0.8	14.45	11.4	9.93	59.8	26.33	12.5	41.06	53.9
10.8	14.79 34	13.3 19	10.98 105	58.0 18	26.66 33	14.5 20	41.40 34	51.5 24
20.8	15.13 34	15.2 19	12.09 111	56.8 12	27.00 34	16.5 20	41.74 34	49.4 21
30.7	15.47 34	17.1 19	13.22 113	56.2 6	27.33 33	18.4 19	42.08 34	47.7 17
Feb. 9.7	15.79 32 30	18.9 18 16	14.33 111 104	56.3 1 8	27.65 32 30	20.1 17 15	42.40 32 30	46.4 13 8
19.7	16.09	20.5	15.37	57.1	27.95	21.6	42.70	45.6
Mar. 1.6	16.36 27	21.9 14	16.32 95	58.5 14	28.22 27	22.9 13	42.98 28	45.2 4
11.6	16.60 24	23.1 12	17.14 82	60.4 19	28.46 24	23.9 10	43.22 24	45.2 0
21.6	16.81 21	24.1 10	17.81 67	62.8 24	28.67 21	24.6 7	43.43 21	45.6 4
31.6	16.99 18 14	24.9 8 5	18.30 49 30	65.5 27 30	28.85 18 15	25.1 5 3	43.61 18 14	46.4 8 11
Apr. 10.5	17.13	25.4	18.60	68.5	29.00	25.4	43.75	47.5
20.5	17.24 11	25.7 3	18.72 12	71.6 31	29.11 11	25.5 1	43.85 10	48.8 13
30.5	17.33 9	25.9 2	18.65 7	74.7 31	29.20 9	25.4 1	43.92 7	50.2 14
May 10.5	17.39 6	25.9 0	18.41 24	77.7 30	29.26 6	25.2 2	43.96 4	51.7 15
20.4	17.42 3 0	25.8 1 2	18.00 41 56	80.4 27 24	29.29 3 1	24.9 3 4	43.97 1 2	53.3 16 16
30.4	17.42	25.6	17.44	82.8	29.30	24.5	43.95	54.9
June 9.4	17.40 2	25.3 3	16.76 68	84.9 21	29.28 2	24.0 5	43.91 4	56.3 14
19.3	17.36 4	24.9 4	15.97 79	86.5 16	29.24 4	23.5 5	43.85 6	57.5 12
29.3	17.30 6	24.5 4	15.10 87	87.6 11	29.18 6	23.0 5	43.76 9	58.6 11
July 9.3	17.22 8 10	24.0 5 5	14.16 94 98	88.2 6 1	29.10 8 10	22.4 6 5	43.66 10 12	59.5 9 6
19.3	17.12	23.5	13.18	88.3	29.00	21.9	43.54	60.1
29.2	17.01 11	23.0 5	12.19 99	87.8 5	28.89 11	21.4 5	43.41 13	60.5 4
Aug. 8.2	16.89 12	22.5 5	11.21 98	86.8 10	28.77 12	21.0 4	43.27 14	60.6 1
18.2	16.77 12	22.0 5	10.26 95	85.3 15	28.65 12	20.6 4	43.13 14	60.4 2
28.2	16.66 11 10	21.6 4 4	9.36 90 83	83.3 20 25	28.53 12 10	20.3 3 2	43.00 13 12	59.9 5 8
Sept. 7.1	16.56	21.2	8.53	80.8	28.43	20.1	42.88	59.1
17.1	16.47 9	20.9 3	7.80 73	77.9 29	28.35 8	20.0 1	42.77 11	58.0 11
27.1	16.41 6	20.8 1	7.19 61	74.7 32	28.29 6	20.1 1	42.69 8	56.6 14
Oct. 7.0	16.38 3	20.8 0	6.71 48	71.2 35	28.26 3	20.3 2	42.65 4	55.0 16
17.0	16.40 2 6	21.0 2 4	6.38 33 16	67.5 37 39	28.27 1 6	20.8 5 7	42.64 1 4	53.1 19 22
27.0	16.46	21.4	6.22	63.6	28.33	21.5	42.68	50.9
Nov. 6.0	16.57 11	22.0 6	6.24 2	59.6 40	28.43 10	22.4 9	42.77 9	48.4 25
15.9	16.73 16	22.9 9	6.44 20	55.7 39	28.58 15	23.6 12	42.91 14	45.8 26
25.9	16.94 21	24.1 12	6.82 38	52.0 37	28.78 20	25.0 14	43.10 19	43.1 27
Dec. 5.9	17.19 25 29	25.5 14 16	7.38 56 73	48.5 35 32	29.03 25 28	26.6 16 18	43.33 23 27	40.3 28 28
15.9	17.48	27.1	8.11	45.3	29.31	28.4	43.60	37.5
25.8	17.80 32	28.9 18	8.98 87	42.5 28	29.62 31	30.3 19	43.91 31	34.8 27
35.8	18.13 33	30.8 19	9.97 99	40.3 22	29.95 33	32.3 20	44.24 33	32.3 25
Sec δ, Tan δ	1.015	-0.174	4.790	+4.685	1.005	-0.098	1.062	+0.357
Mean Place	15°.168	9''.18	10°.177	82''.56	27°.022	8''.77	41°.559	65''.69
D'ψ α, Dω α	0.00	-0.01	-0.07	+0.26	0.00	-0.01	-0.01	+0.02
Dψ δ, Dω δ	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5	-0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Boötis. Mag. 4.3		λ Virginis. Mag. 4.6		♌ Libræ. Mag. 6.3		θ Boötis. Mag. 4.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 14 13	° ' +46 28	h m 14 14	° ' -12 58	h m 14 18	° ' -11 19	h m 14 22	° ' +52 14
Jan. 0.8	4.30	56.0	23.16	17.4	43.79	3.8	13.71	49.2
10.8	4.71 41	53.6 24	23.51 35	19.3 19	44.13 34	5.7 19	14.15 44	46.8 24
20.8	5.13 42	51.8 18	23.85 34	21.2 19	44.48 35	7.6 19	14.60 45	44.9 19
30.7	5.55 42	50.6 12	24.19 34	23.0 18	44.82 34	9.4 18	15.05 45	43.7 12
Feb. 9.7	5.96 41	49.9 7	24.52 33	24.8 18	45.14 32	11.2 18	15.49 44	43.1 6
	38	0	30	17	30	16	42	0
19.7	6.34	49.9	24.82	26.5	45.44	12.8	15.91	43.1
Mar. 1.7	6.68 34	50.5 6	25.10 28	28.0 15	45.72 28	14.2 14	16.30 39	43.7 6
11.6	6.98 30	51.6 11	25.35 25	29.3 13	45.97 25	15.5 13	16.64 34	44.9 12
21.6	7.24 26	53.2 16	25.57 22	30.4 11	46.19 22	16.5 10	16.93 29	46.6 17
31.6	7.45 21	55.2 20	25.75 18	31.3 9	46.38 19	17.3 8	17.16 23	48.8 22
	16	23	15	7	16	6	18	25
Apr. 10.5	7.61	57.5	25.90	32.0	46.54	17.9	17.34	51.3
20.5	7.71 10	60.0 25	26.02 12	32.5 5	46.66 12	18.3 4	17.46 12	54.0 27
30.5	7.76 5	62.7 27	26.11 9	32.9 4	46.76 10	18.5 2	17.52 6	56.8 28
May 10.5	7.77 1	65.4 27	26.18 7	33.1 2	46.83 7	18.6 1	17.53 1	59.6 28
20.4	7.73 4	67.9 25	26.22 4	33.1 0	46.87 4	18.5 1	17.48 5	62.3 27
	8	23	1	1	1	1	9	25
30.4	7.65	70.2	26.23	33.0	46.88	18.4	17.39	64.8
June 9.4	7.54 11	72.3 21	26.22 1	32.9 1	46.87 1	18.2 2	17.25 14	67.0 22
19.4	7.39 15	74.1 18	26.18 4	32.7 2	46.84 3	17.9 3	17.07 18	68.9 19
29.3	7.22 17	75.5 14	26.12 6	32.4 3	46.78 6	17.5 4	16.86 21	70.4 15
July 9.3	7.02 20	76.5 10	26.04 8	32.0 4	46.70 8	17.1 4	16.63 23	71.5 11
	21	6	10	5	10	4	25	6
19.3	6.81	77.1	25.94	31.5	46.60	16.7	16.38	72.1
29.2	6.59 22	77.3 2	25.83 11	31.0 5	46.49 11	16.2 5	16.11 27	72.2 1
Aug. 8.2	6.36 23	77.0 3	25.71 12	30.5 5	46.37 12	15.7 5	15.83 28	71.8 4
18.2	6.13 23	76.2 8	25.58 13	30.0 5	46.25 12	15.2 5	15.56 27	71.0 8
28.2	5.91 22	75.0 12	25.46 12	29.5 5	46.13 12	14.8 4	15.30 26	69.7 13
	20	17	11	5	11	4	25	17
Sept. 7.1	5.71	73.3	25.35	29.0	46.02	14.4	15.05	68.0
17.1	5.54 17	71.2 21	25.26 9	28.6 4	45.93 9	14.1 3	14.83 22	65.8 22
27.1	5.40 14	68.8 24	25.20 6	28.3 3	45.86 7	13.9 2	14.65 18	63.2 26
Oct. 7.1	5.30 10	66.0 28	25.17 3	28.2 1	45.82 4	13.8 1	14.52 13	60.3 29
17.0	5.26 4	62.9 31	25.18 1	28.2 0	45.83 1	13.9 1	14.44 8	57.1 32
	1	33	6	2	5	3	2	35
27.0	5.27	59.6	25.24	28.4	45.88	14.2	14.42	53.6
Nov. 6.0	5.34 7	56.1 35	25.35 11	28.9 5	45.98 10	14.7 5	14.47 5	50.0 36
15.9	5.47 13	52.6 35	25.51 16	29.6 7	46.13 15	15.5 8	14.59 12	46.3 37
25.9	5.67 20	49.0 36	25.71 20	30.6 10	46.33 20	16.6 11	14.78 19	42.5 38
Dec. 5.9	5.93 26	45.5 35	25.96 25	31.8 12	46.58 25	17.9 13	15.04 26	38.9 36
	31	33	29	14	28	15	32	34
15.9	6.24	42.2	26.25	33.2	46.86	19.4	15.36	35.5
25.8	6.60 36	39.2 30	26.56 31	34.8 16	47.17 31	21.1 17	15.73 37	32.4 31
35.8	6.99 39	36.6 26	26.89 33	36.6 18	47.51 34	22.9 18	16.14 41	29.7 27
Sec δ, Tan δ	1.452	+1.053	1.026	-0.230	1.020	-0.200	1.633	+1.291
Mean Place	4°.673	74''.69	23°.949	16''.02	44°.583	1''.72	14°.156	69''.03
D'φ α, Dω α	-0.02	+0.06	0.00	-0.01	0.00	-0.01	-0.02	+0.07
D'φ δ, Dω δ	-0.3	-0.5	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	f Boötis. Mag. 5.4		φ Virginis. Mag. 5.0		δ Ursæ Minoris. Mag. 4.4		ρ Boötis. Mag. 3.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 14 22	° ' +19 36	h m 14 23	° ' - 1 50	h m 14 27	° ' +76 4	h m 14 28	° ' +30 44
	s	"	s	"	s	"	s	"
Jan. 0.8	23.98	51.3	42.38	23.6	40.88	35.6	4.32	55.1
10.8	24.32 34	48.9 24	42.71 33	25.6 20	41.77 89	33.5 21	4.67 35	52.6 25
20.8	24.66 34	46.8 21	43.05 34	27.6 20	42.72 95	32.0 15	5.02 35	50.6 20
30.7	25.00 34	45.1 17	43.38 33	29.4 18	43.70 98	31.1 9	5.38 36	49.0 16
Feb. 9.7	25.33 33	43.8 13	43.70 32	31.0 16	44.68 98	30.9 2	5.73 35	47.9 11
	31	8	30	14	94	5	33	6
19.7	25.64	43.0	44.00	32.4	45.62	31.4	6.06	47.3
Mar. 1.7	25.92 28	42.6 4	44.27 27	33.5 11	46.49 87	32.6 12	6.36 30	47.2 1
11.6	26.17 25	42.6 0	44.52 25	34.4 9	47.26 77	34.3 17	6.63 27	47.7 5
21.6	26.39 22	43.1 5	44.74 22	35.0 6	47.90 64	36.5 22	6.87 24	48.6 9
31.6	26.57 18	43.9 8	44.93 19	35.3 3	48.40 50	39.1 26	7.07 20	49.9 13
	15	11	15	0	34	29	16	17
Apr. 10.5	26.72	45.0	45.08	35.3	48.74	42.0	7.23	51.6
20.5	26.84 12	46.4 14	45.20 12	35.1 2	48.92 18	45.1 31	7.35 12	53.5 19
30.5	26.93 9	48.0 16	45.30 10	34.8 3	48.94 2	48.2 31	7.43 8	55.6 21
May 10.5	26.98 5	49.6 16	45.37 7	34.3 5	48.80 14	51.3 31	7.48 5	57.8 22
20.4	27.00 2	51.3 17	45.41 4	33.7 6	48.52 28	54.2 29	7.49 1	59.9 21
	1	16	1	6	41	26	2	20
30.4	26.99	52.9	45.42	33.1	48.11	56.8	7.47	61.9
June 9.4	26.96 3	54.4 15	45.41 1	32.4 7	47.58 53	59.1 23	7.42 5	63.8 19
19.4	26.91 5	55.8 14	45.38 3	31.7 7	46.94 64	60.9 18	7.42 7	63.8 17
29.3	26.83 8	57.0 12	45.32 6	31.0 7	46.22 72	62.3 14	7.35 10	65.5 14
July 9.3	26.73 10	58.0 10	45.24 8	30.4 6	45.44 78	63.2 9	7.25 13	66.9 12
	12	7	9	6	83	4	14	8
19.3	26.61	58.7	45.15	29.8	44.61	63.6	6.98	68.9
29.2	26.48 13	59.2 5	45.04 11	29.3 5	43.75 86	63.4 2	6.83 15	69.4 5
Aug. 8.2	26.34 14	59.4 2	44.92 12	28.9 4	42.88 87	62.7 7	6.66 17	69.5 1
18.2	26.20 14	59.3 1	44.80 12	28.6 3	42.03 85	61.4 13	6.49 17	69.2 3
28.2	26.06 14	58.9 4	44.68 12	28.4 2	41.22 81	59.6 18	6.33 16	68.5 7
	13	6	11	1	76	22	15	10
Sept. 7.1	25.93	58.3	44.57	28.3	40.46	57.4	6.18	67.5
17.1	25.82 11	57.3 10	44.47 10	28.4 1	39.77 69	54.8 26	6.04 14	66.1 14
27.1	25.74 8	56.0 13	44.40 7	28.6 2	39.18 59	51.8 30	5.93 11	64.4 17
Oct. 7.1	25.69 5	54.4 16	44.36 4	29.0 4	38.70 48	48.4 34	5.86 7	62.3 21
17.0	25.67 2	52.6 18	44.36 0	29.6 6	38.34 36	44.8 36	5.82 4	59.9 24
	3	21	4	9	21	38	1	26
27.0	25.70	50.5	44.40	30.5	38.13	41.0	5.83	57.3
Nov. 6.0	25.78 8	48.2 23	44.49 9	31.6 11	38.07 6	37.1 39	5.90 7	54.4 29
15.9	25.91 13	45.6 26	44.63 14	33.0 14	38.17 10	33.2 39	6.02 12	51.4 30
25.9	26.09 18	42.9 27	44.82 19	34.6 16	38.44 27	29.4 38	6.19 17	48.3 31
Dec. 5.9	26.31 22	40.2 27	45.05 23	36.4 18	38.87 43	25.8 36	6.41 22	45.2 31
	27	27	27	19	58	34	27	31
15.9	26.58	37.5	45.32	38.3	39.45	22.4	6.68	42.1
25.8	26.88 30	34.8 27	45.62 30	40.3 20	40.17 72	19.4 30	6.99 31	39.2 29
35.8	27.20 32	32.3 25	45.94 32	42.3 20	41.00 83	17.0 24	7.32 33	36.5 27
Sec δ, Tan δ	1.062	+0.356	1.001	-0.032	4.156	+4.034	1.164	+0.595
Mean Place	24°.542	63''.23	43°.102	18''.22	41°.630	58''.15	4°.862	70''.27
D'ψ α, Dω α	-0.01	+0.02	0.00	0.00	-0.06	+0.22	-0.01	+0.03
Dψ δ, Dω δ	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Time	γ Boötis. Mag. 3.0	
	Right Ascension.	Declina- tion N.
	h m	° '
	14 28	+38 40
		"
Jan. 0.8	34.01	61.1
10.8	34.38 37	58.6 25
20.8	34.76 38	56.6 20
30.7	35.14 38	55.1 15
Feb. 9.7	35.51 38	54.1 10
	35	4
19.7	35.86	53.7
Mar. 1.7	36.19 33	53.9 2
11.6	36.48 29	54.7 8
21.6	36.73 25	56.0 13
31.6	36.94 21	57.6 16
	16	20
Apr. 10.6	37.10	59.6
20.5	37.22 12	61.9 23
30.5	37.30 8	64.3 24
May 10.5	37.34 4	66.7 24
20.4	37.34 0	69.1 24
	3	23
30.4	37.31	71.4
June 9.4	37.24 7	73.5 21
19.4	37.14 10	75.3 18
29.3	37.01 13	76.8 15
July 9.3	36.86 15	78.0 12
	17	8
19.3	36.69	78.8
29.3	36.50 19	79.2 4
Aug. 8.2	36.31 19	79.2 0
18.2	36.11 20	78.8 4
28.2	35.92 19	77.9 9
	18	13
Sept. 7.1	35.74	76.6
17.1	35.58 16	74.9 17
27.1	35.45 13	72.9 20
Oct. 7.1	35.36 9	70.5 24
17.0	35.31 5	67.8 27
	0	30
27.0	35.31	64.8
Nov. 6.0	35.37 6	61.6 32
16.0	35.48 11	58.3 33
25.9	35.65 17	54.9 34
Dec. 5.9	35.88 23	51.5 34
	28	32
15.9	36.16	48.3
25.8	36.48 32	45.3 30
35.8	36.83 35	42.6 27
Sec δ , Tan δ	1.281	+0.801
Mean Place	34°.531	78''.22
$D^{\circ}\delta$, $D_{\omega}\alpha$	-0.01	+0.04
$D^{\circ}\delta$, $D_{\omega}\delta$	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	33 Boëtis. Mag. 5.4		α Apodis. Mag. 3.8		μ Virginis. Mag. 4.0		ε Boëtis. Mag. 2.7	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 14 35 s	° ' +44 46 "	h m 14 36 s	° ' -78 40 "	h m 14 38 s	° ' - 5 16 "	h m 14 41 s	° ' +27 25 "
Jan. 0.8	35.46	27.7	53.93	23.1	27.58	54.5	10.61	71.2
10.8	35.84 38	25.1 26	55.23 130	22.8 3	27.91 33	56.5 20	10.94 33	68.7 25
20.8	36.24 40	23.1 20	56.58 135	23.1 3	28.25 34	58.4 19	11.29 35	66.6 21
30.7	36.65 41	21.6 15	57.94 136	23.9 8	28.58 33	60.2 18	11.64 35	64.9 17
Feb. 9.7	37.05 40 38	20.7 9 3	59.27 133 127	25.2 13 18	28.91 33 31	61.8 16 15	11.98 34 33	63.7 12 8
19.7	37.43	20.4	60.54	27.0	29.22	63.3	12.31	62.9
Mar. 1.7	37.78 35	20.7 3	61.73 119	29.3 23	29.50 28	64.5 12	12.61 30	62.6 3
11.6	38.10 32	21.6 9	62.82 109	31.9 26	29.76 26	65.4 9	12.89 28	62.9 3
21.6	38.38 28	23.0 14	63.79 97	34.8 29	29.99 23	66.1 7	13.13 24	63.7 8
31.6	38.61 23 18	24.9 19 22	64.62 83 69	38.0 32 33	30.19 20 17	66.6 5 2	13.34 21 17	64.8 11 15
Apr. 10.6	38.79	27.1	65.31	41.3	30.36	66.8	13.51	66.3
20.5	38.92 13 8	29.5 24 26	65.84 53 36	44.7 34 35	30.50 14 11	66.8 0 1	13.64 13 10	68.1 18 19
30.5	39.00	32.1	66.20	48.2	30.61	66.7	13.74	70.0
May 10.5	39.04 4	34.8 27	66.40 20	51.6 34	30.70 9	66.4 3	13.81 7	72.0 20
20.4	39.03 1 5	37.4 26 24	66.44 4 13	54.9 33 31	30.76 6 3	66.0 4 5	13.84 3 0	74.1 21 20
30.4	38.98	39.8	66.31	58.0	30.79	65.5	13.84	76.1
June 9.4	38.90 8	42.1 23	66.02 29	60.8 28	30.79 0	65.0 5	13.81 3	78.0 19
19.4	38.78 12	44.1 20	65.57 45	63.3 25	30.77 2	64.4 6	13.75 6	79.7 17
29.3	38.63 15	45.7 16	64.99 58	65.5 22	30.72 5	63.8 6	13.66 9	81.2 15
July 9.3	38.45 18 20	47.0 13 8	64.29 70 80	67.2 17 12	30.65 7 9	63.2 6 5	13.55 11 13	82.4 12 9
19.3	38.25	47.8	63.49	68.4	30.56	62.7	13.42	83.3
29.3	38.03 22	48.2 4	62.61 88	69.1 7	30.46 10	62.2 5	13.27 15	83.9 6
Aug. 8.2	37.81 22	48.1 1	61.69 92	69.2 1	30.34 12	61.8 4	13.11 16	84.1 2
18.2	37.58 23	47.6 5	60.77 92	68.8 4	30.21 13	61.4 4	12.95 16	84.0 1
28.2	37.35 23 21	46.7 9 14	59.87 90 84	67.9 9 14	30.08 13 12	61.1 3 2	12.79 16 16	83.5 5 8
Sept. 7.1	37.14	45.3	59.03	66.5	29.96	60.9	12.63	82.7
17.1	36.95 19	43.5 18	58.29 74	64.6 19	29.85 11	60.9 0	12.49 14	81.5 12
27.1	36.79 16	41.3 22	57.69 60	62.3 23	29.77 8	61.0 1	12.38 11	80.0 15
Oct. 7.1	36.67 12	38.7 26	57.26 43	59.7 26	29.72 5	61.2 2	12.30 8	78.1 19
17.0	36.60 7 2	35.8 29 32	57.02 24 3	56.9 28 29	29.71 1 3	61.6 4 7	12.26 4 0	75.9 22 24
27.0	36.58	32.6	56.99	54.0	29.74	62.3	12.26	73.5
Nov. 6.0	36.62 4	29.2 34	57.19 20	51.1 29	29.82 8	63.2 9	12.31 5	70.8 27
16.0	36.72 10	25.7 35	57.62 43	48.4 27	29.95 13	64.3 11	12.41 10	67.9 29
25.9	36.88 16	22.1 36	58.26 64	45.9 25	30.12 17	65.7 14	12.57 16	64.9 30
Dec. 5.9	37.11 23 28	18.6 35 34	59.10 84 102	43.7 22 17	30.34 22 26	67.2 15 17	12.78 21 25	61.9 30 30
15.9	37.39	15.2	60.12	42.0	30.60	68.9	13.03	58.9
25.8	37.72 33	12.1 31	61.28 116	40.8 12	30.90 30	70.8 19	13.32 29	56.0 29
35.8	38.08 36	9.3 28	62.54 126	40.1 7	31.22 32	72.7 19	13.65 33	53.3 27
Sec δ, Tan δ	1.409	+0.992	5.094	-4.995	1.004	-0.093	1.127	+0.519
Mean Place	36°.032	46''.09	59°.789	35''.33	28°.415	49''.77	11°.253	85''.67
D'ψ α, Dω α	-0.02	+0.05	+0.08	-0.26	0.00	0.00	-0.01	+0.03
Dψ δ, Dω δ	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6	-0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Ursæ Minoris. Mag. 2.2		ξ^2 Libræ. Mag. 5.6		Piazzi 221. Mag. 5.8		β Lupi. Mag. 2.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 14 50 s	° ' +74 30 "	h m 14 52 s	° ' -11 3 "	h m 14 52 s	° ' +14 47 "	h m 14 52 s	° ' -42 46 "
Jan. 0.8	55.61	17.5	1.73	36.4	6.01	39.4	47.99	58.3
10.8	56.38 77	15.1 24	2.06 33	38.1 17	6.33 32	37.0 24	48.41 42	58.9 6
20.8	57.22 84	13.3 18	2.39 33	39.9 18	6.66 33	34.9 21	48.84 43	59.9 10
30.8	58.10 88	12.1 12	2.73 34	41.6 17	6.99 33	33.1 18	49.27 43	61.2 13
Feb. 9.7	58.99 89 87	11.6 5 2	3.06 33 32	43.2 16 15	7.32 33 31	31.6 15 11	49.69 42 41	62.7 15 17
19.7	59.86 82	11.8 8	3.38 30	44.7 13	7.63 29	30.5 6	50.10 38	64.4 19
Mar. 1.7	60.68 74	12.6 14	3.68 27	46.0 11	7.92 27	29.9 2	50.48 35	66.3 20
11.6	61.42 64	14.0 20	3.95 24	47.1 9	8.19 24	29.7 2	50.83 32	68.3 21
21.6	62.06 52	16.0 25	4.19 22	48.0 7	8.43 21	29.9 5	51.15 28	70.4 21
31.6	62.58 38	18.5 28	4.41 19	48.7 5	8.64 18	30.4 9	51.43 25	72.5 21
Apr. 10.6	62.96 25	21.3 30	4.60 16	49.2 3	8.82 15	31.3 11	51.68 21	74.6 20
20.5	63.21 11	24.3 31	4.76 13	49.5 2	8.97 12	32.4 13	51.89 17	76.6 19
30.5	63.32 4	27.4 31	4.89 10	49.7 0	9.09 8	33.7 15	52.06 12	78.5 19
May 10.5	63.28 17 30	30.5 30 28	4.99 7 4	49.7 1 2	9.17 5 2	35.2 16 15	52.18 9 5	80.4 17 16
30.4	62.81 42	36.3 25	5.10 2	49.4 3	9.24 0	38.3 14	52.32 1	83.7 14
June 9.4	62.39 52	38.8 21	5.12 1	49.1 3	9.24 3	39.7 14	52.33 3	85.1 12
19.4	61.87 60	40.9 17	5.11 4	48.8 4	9.21 5	41.1 13	52.30 7	86.3 9
29.3	61.27 67 73	42.6 13 7	5.07 6 9	48.4 4 4	9.16 8 10	42.4 11 9	52.23 10 14	87.2 7 4
July 9.3	60.60 77	43.9 2	5.01 11	48.0 5	9.08 12	43.5 6	52.13 16	87.9 1
19.3	59.87 79	44.6 3	4.92 12	47.6 5	8.98 14	44.4 4	51.99 18	88.3 2
29.3	59.10 79	44.8 9	4.81 13	47.1 4	8.86 14	45.0 2	51.83 19	88.4 5
Aug. 8.2	58.31 77	44.5 14	4.69 13	46.6 4	8.72 14	45.4 1	51.65 19	88.2 8
18.2	57.52 73	43.6 19	4.56 13	46.2 3	8.58 14	45.6 4	51.46 19	87.7 10
28.2	56.75 73	42.2 19	4.43 13	45.8 3	8.44 14	45.5 4	51.27 19	86.9 10
Sept. 7.2	56.02 68	40.3 23	4.30 12	45.5 3	8.30 13	45.1 7	51.08 17	85.9 12
17.1	55.34 60	38.0 28	4.18 9	45.2 2	8.17 10	44.4 9	50.91 13	84.7 14
27.1	54.74 51	35.2 31	4.09 6	45.0 0	8.07 8	43.5 12	50.78 9	83.3 15
Oct. 7.1	54.23 40 28	32.1 34 37	4.03 2 2	45.0 1 3	7.99 4 0	42.3 15 18	50.69 4 2	81.8 16 15
17.0	53.83 14	25.0 38	4.03 6	45.4 5	7.95 5	39.0 20	50.67 8	78.7 13
27.0	53.55 1	21.2 39	4.09 12	45.9 7	8.00 10	37.0 23	50.75 15	77.4 12
Nov. 6.0	53.41 16	17.3 39	4.21 17	46.6 9	8.10 15	34.7 24	50.90 21	76.2 10
16.0	53.42 31	13.4 38	4.38 22	47.5 12	8.25 20	32.3 25	51.11 28	75.2 7
25.9	53.58 46	9.6 35	4.60 26	48.7 14	8.45 24	29.8 26	51.39 33	74.5 3
Dec. 5.9	53.89 59	6.1 31	4.86 29	50.1 15	8.69 28	27.2 26	51.72 37	74.2 1
15.9	54.35 70	3.0 28	5.15 31	51.6 17	8.97 31	24.6 24	52.09 41	74.3 4
25.9	54.94	0.2	5.46	53.3	9.28	22.2	52.50	74.7
35.8	55.64							
Sec δ , Tan δ	3.743	+3.608	1.019	-0.196	1.034	+0.264	1.363	-0.926
Mean Place	56°.879	39''.70	2°.679	32''.91	6°.774	50''.47	49°.527	63''.39
D' ψ α , D ω α	-0.06	+0.18	0.00	-0.01	0.00	+0.01	+0.02	-0.04
D ψ δ , D ω δ	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Libræ. Var. 4.8-6.2		β Boötis. Mag. 3.6		γ Scorpii. Mag. 3.4		ψ Boötis. Mag. 4.7	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 14 56 s	° ' " 8 10 "	h m 14 58 s	° ' " +40 43 "	h m 14 58 s	° ' " -24 56 "	h m 15 0 s	° ' " +27 16 "
Jan. 0.8	18.35	32.0	39.38	42.0	57.33	25.9	42.28	56.3
10.8	18.67 32	33.8 18	39.74 36	39.3 27	57.68 35	27.1 12	42.61 33	53.7 26
20.8	19.00 33	35.6 18	40.11 37	37.1 22	58.04 36	28.5 14	42.95 34	51.4 23
30.8	19.34 34	37.3 17	40.49 38	35.4 17	58.40 36	30.0 15	43.30 35	49.6 18
Feb. 9.7	19.67 33 31	38.9 16 15	40.87 38 37	34.2 12 6	58.76 36 34	31.6 16 16	43.64 34 33	48.3 13 9
19.7	19.98	40.4	41.24	33.6	59.10	33.2	43.97	47.4
Mar. 1.7	20.27 29	41.6 12	41.59 35	33.6 0	59.42 32	34.8 16	44.28 31	47.0 4
11.7	20.54 27	42.6 10	41.91 32	34.2 6	59.72 30	36.3 15	44.56 28	47.2 2
21.6	20.79 25	43.4 8	42.19 28	35.3 11	59.99 27	37.7 14	44.82 26	47.9 7
31.6	21.01 22 19	43.9 5 3	42.43 24 20	36.9 16 20	60.23 24 21	39.0 13 12	45.04 22 19	49.0 11 14
Apr. 10.6	21.20	44.2	42.63	38.9	60.44	40.2	45.23	50.4
20.5	21.36 16	44.3 1	42.79 16	41.2 23	60.62 18	41.3 11	45.39 16	52.1 17
30.5	21.49 13	44.3 0	42.91 12	43.7 25	60.77 15	42.2 9	45.51 12	54.1 20
May 10.5	21.59 10	44.1 2	42.98 7	46.3 26	60.89 12	43.0 8	45.59 8	56.2 21
20.5	21.67 8 5	43.8 3 4	43.01 3 1	48.9 26 25	60.98 9 6	43.7 7 6	45.64 5 2	58.3 21 21
30.4	21.72	43.4	43.00	51.4	61.04	44.3	45.66	60.4
June 9.4	21.74 2	43.0 4	42.95 5	53.8 24	61.06 2	44.8 5	45.65 1	62.4 20
19.4	21.73 1	42.6 4	42.86 9	55.9 21	61.05 1	45.1 3	45.60 5	64.2 18
29.4	21.69 4	42.1 5	42.74 12	57.7 18	61.01 4	45.3 2	45.52 8	65.8 16
July 9.3	21.63 6 9	41.6 5 5	42.59 15 17	59.1 14 11	60.94 7 9	45.4 1 1	45.42 10 13	67.2 14 10
19.3	21.54 10	41.1 5	42.42 19	60.2 7	60.85 12	45.3 2	45.29 14	68.2 7
29.3	21.44 12	40.6 4	42.23 21	60.9 3	60.73 13	45.1 3	45.15 16	68.9 4
Aug. 8.2	21.32 13	40.2 4	42.02 22	61.2 2	60.60 14	44.8 5	44.99 17	69.3 1
18.2	21.19 13	39.8 3	41.80 21	61.0 6	60.46 15	44.3 6	44.82 17	69.4 3
28.2	21.06 13 13	39.5 3 3	41.59 21 21	60.4 11	60.31 15 15	43.7 7	44.65 17 17	69.1 7 7
Sept. 7.2	20.93	39.2	41.38	59.3	60.16	43.0	44.48	68.4
17.1	20.81 12	39.0 2	41.18 20	57.8 15	60.03 13	42.3 7	44.33 15	67.3 11
27.1	20.71 10	38.9 1	41.01 17	55.9 19	59.92 11	41.6 7	44.20 13	65.9 14
Oct. 7.1	20.65 6	39.0 1	40.88 13	53.6 23	59.85 7	40.9 7	44.10 10	64.2 17
17.1	20.62 3 1	39.3 3 4	40.79 9 5	51.0 26 29	59.82 3 1	40.3 6 6	44.03 7 2	62.1 21 24
27.0	20.63 6	39.7 7	40.74 1	48.1 32	59.83 7	39.7 4	44.01 3	59.7 26
Nov. 6.0	20.69 11	40.4 9	40.75 8	44.9 33	59.90 12	39.3 1	44.04 8	57.1 28
16.0	20.80 17	41.3 11	40.83 13	41.6 34	60.02 18	39.2 1	44.12 14	54.3 30
25.9	20.97 21	42.4 13	40.96 19	38.2 35	60.20 23	39.3 3	44.26 19	51.3 30
Dec. 5.9	21.18 25	43.7 15	41.15 25	34.7 34	60.43 27	39.6 6	44.45 23	48.3 30
15.9	21.43 28	45.2 17	41.40 29	31.3 32	60.70 31	40.2 8	44.68 27	45.3 29
25.9	21.71 31	46.9 17	41.69 33	28.1 29	61.01 34	41.0 11	44.95 31	42.4 28
35.8	22.02	48.6	42.02	25.2	61.35	42.1	45.26	39.6
Sec δ , Tan δ	1.010	-0.144	1.320	+0.861	1.103	-0.465	1.125	+0.516
Mean Place	19°.288	27''.50	40°.142	59''.62	58°.493	26''.08	43°.053	70''.78
D' ϕ α , D ω α	0.00	-0.01	-0.02	+0.04	+0.01	-0.02	-0.01	+0.02
D' ϕ δ , D ω δ	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♄ Boëtis. Mag. 5.0		♅ Lupl. Mag. 3.5		♈ Libræ. Mag. 4.7		♎ Triang. Aust. Mag. 3.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 15 3	° ' +25 11	h m 15 5	° ' -51 46	h m 15 7	° ' -19 27	h m 15 10	° ' -68 21
	s	"	s	"	s	"	s	"
Jan. 0.9	28.00	72.6	59.69	1.0	14.41	49.3	42.73	24.5
10.8	28.32 32	70.1 25	60.17 48	1.2 2	14.75 34	50.7 14	43.45 72	24.1 4
20.8	28.66 34	67.8 23	60.66 49	1.8 6	15.10 35	52.1 14	44.21 76	24.1 0
30.8	29.00 34	65.9 19	61.16 50	2.7 9	15.45 35	53.6 15	44.99 78	24.6 5
Feb. 9.7	29.34 34	64.5 14	61.65 49	4.0 13	15.79 34	55.2 16	45.76 77	25.6 10
	32	9	47	16	33	15	75	14
19.7	29.66	63.6	62.12	5.6	16.12	56.7	46.51	27.0
Mar. 1.7	29.97 31	63.2 4	62.57 45	7.4 18	16.44 32	58.1 14	47.23 72	28.8 18
11.7	30.26 29	63.3 1	62.99 42	9.4 20	16.73 29	59.4 13	47.90 67	30.9 21
21.6	30.52 26	63.9 6	63.37 38	11.6 22	17.00 27	60.6 12	48.52 62	33.3 24
31.6	30.74 22	64.9 10	63.72 35	13.9 23	17.24 24	61.6 10	49.07 55	35.9 26
	19	13	30	23	21	9	48	28
Apr. 10.6	30.93	66.2	64.02	16.2	17.45	62.5	49.55	38.7
20.6	31.09 16	67.8 16	64.28 26	18.6 24	17.63 18	63.2 7	49.96 41	41.6 29
30.5	31.21 12	69.7 19	64.49 21	20.9 23	17.78 15	63.8 6	50.29 33	44.6 30
May 10.5	31.30 9	71.7 20	64.65 16	23.2 23	17.90 12	64.3 5	50.53 24	47.6 30
20.5	31.36 6	73.8 21	64.77 12	25.4 22	18.00 10	64.6 3	50.68 15	50.5 29
	2	20	7	20	6	2	7	28
30.4	31.38	75.8	64.84	27.4	18.06	64.8	50.75	53.3
June 9.4	31.37 1	77.7 19	64.85 1	29.2 18	18.09 3	64.9 1	50.73 2	55.9 26
19.4	31.33 4	79.5 18	64.82 3	30.8 16	18.09 0	65.0 1	50.62 11	58.3 24
29.4	31.26 7	81.1 16	64.74 8	32.2 14	18.06 3	65.0 0	50.42 20	60.4 21
July 9.3	31.17 9	82.4 13	64.62 12	33.3 11	18.00 6	64.9 1	50.15 27	62.1 17
	12	10	17	8	8	2	34	13
19.3	31.05	83.4	64.45	34.1	17.92	64.7	49.81	63.4
29.3	30.91 14	84.1 7	64.25 20	34.5 4	17.82 10	64.4 3	49.42 39	64.2 8
Aug. 8.3	30.76 15	84.5 4	64.02 23	34.6 1	17.69 13	64.1 3	48.99 43	64.6 4
18.2	30.60 16	84.6 1	63.78 24	34.3 3	17.55 14	63.7 4	48.54 45	64.5 1
28.2	30.43 17	84.4 2	63.54 24	33.6 7	17.41 14	63.2 5	48.08 46	63.9 6
	16	6	24	10	14	5	45	10
Sept. 7.2	30.27	83.8	63.30	32.6	17.27	62.7	47.63	62.9
17.1	30.12 15	82.8 10	63.08 22	31.3 13	17.14 13	62.2 5	47.22 41	61.4 15
27.1	29.99 13	81.5 13	62.90 18	29.8 15	17.03 11	61.7 5	46.87 35	59.6 18
Oct. 7.1	29.89 10	79.9 16	62.76 14	28.0 18	16.95 8	61.2 5	46.60 27	57.4 22
17.1	29.83 6	77.9 20	62.68 8	26.1 19	16.91 4	60.8 4	46.42 18	55.0 24
	2	23	0	19	1	2	6	26
27.0	29.81	75.6	62.68	24.2	16.92	60.6	46.36	52.4
Nov. 6.0	29.84 3	73.1 25	62.75 7	22.3 19	16.98 6	60.6 0	46.42 6	49.8 26
16.0	29.92 8	70.4 27	62.90 15	20.6 17	17.09 11	60.8 2	46.60 18	47.3 25
25.9	30.05 13	67.5 29	63.12 22	19.1 15	17.25 16	61.2 4	46.91 31	45.0 23
Dec. 5.9	30.24 19	64.6 29	63.42 30	17.8 13	17.46 21	61.8 6	47.34 43	43.0 20
	23	30	36	9	25	8	53	17
15.9	30.47	61.6	63.78	16.9	17.71	62.6	47.87	41.3
25.9	30.74 27	58.7 29	64.19 41	16.4 5	18.01 30	63.7 11	48.49 62	40.0 13
35.8	31.04 30	56.0 27	64.65 46	16.3 1	18.34 33	65.0 13	49.18 69	39.2 8
Sec δ, Tan δ	1.105	+0.471	1.616	-1.270	1.061	-0.353	2.712	-2.521
Mean Place	28°.787	86''.64	61°.652	7''.22	15°.536	47''.52	46°.150	33''.08
D'ψ a, Dω a	-0.01	+0.02	+0.02	-0.06	+0.01	-0.02	+0.05	-0.11
Dψ δ, Dω δ	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7	-0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Boötis <i>pr.</i> Mag. 4.5		τ^1 Serpentis. Mag. 5.5		ι Draconis. Mag. 3.5		ρ Octantis. Mag. 5.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 15 21 s	° ' +37 40 "	h m 15 21 s	° ' +15 43 "	h m 15 22 s	° ' +59 15 "	h m 15 22 s	° ' -84 10 "
Jan. 0.9	11.31	37.6	44.29	48.1	58.47	53.5	50.47	31.1
10.8	11.64 33	34.8 28	44.59 30	45.7 24	58.89 42	50.6 29	52.77 230	30.0 11
20.8	11.99 35	32.4 24	44.91 32	43.5 22	59.36 47	48.2 24	55.23 246	29.4 6
30.8	12.36 37	30.4 20	45.24 33	41.6 19	59.86 50	46.4 18	57.79 256	29.4 0
Feb. 9.8	12.73 37 36	29.0 14 8	45.57 33 32	40.1 15 11	60.37 51 50	45.2 12 5	60.39 260 257	29.9 5 10
19.7	13.09	28.2	45.89	39.0	60.87	44.7	62.96	30.9
Mar. 1.7	13.43 34	28.0 2	46.19 30	38.3 7	61.35 48	44.9 2	65.44 248	32.4 15
11.7	13.75 32	28.4 4	46.47 28	38.0 3	61.80 45	45.7 8	67.78 234	34.4 20
21.6	14.04 29	29.3 9	46.73 26	38.2 2	62.21 41	47.1 14	69.95 217	36.8 24
31.6	14.30 26 22	30.7 14 18	46.96 23 20	38.8 6 9	62.56 35 29	49.1 20 24	71.90 195 170	39.4 26 30
Apr. 10.6	14.52	32.5	47.16	39.7	62.85	51.5	73.60	42.4
20.6	14.70 18	34.6 21	47.34 18	40.9 12	63.07 22	54.2 27	75.01 141	45.6 32
30.5	14.84 14	37.0 24	47.49 15	42.3 14	63.23 16	57.2 30	76.12 111	48.9 33
May 10.5	14.94 10	39.5 25	47.60 11	43.9 16	63.32 9	60.3 31	76.91 79	52.3 34
20.5	15.00 6 2	42.1 26 25	47.68 8 5	45.5 16 17	63.34 2 5	63.3 30 30	77.36 45 11	55.7 34 33
30.5	15.02	44.6	47.73	47.2	63.29	66.3	77.47	59.0
June 9.4	15.00 2	47.0 24	47.75 2	48.8 16	63.18 11	69.1 28	77.24 23	62.2 32
19.4	14.94 6	49.2 22	47.74 1	50.4 16	63.01 17	71.6 25	76.67 57	65.2 30
29.4	14.85 9	51.2 20	47.70 4	51.8 14	62.79 22	73.8 22	75.78 89	67.8 26
July 9.3	14.73 12 15	52.9 17 13	47.63 7 9	53.1 13 10	62.52 27 31	75.6 18 13	74.61 117 142	70.1 23 18
19.3	14.58 18	54.2 9	47.54 12	54.1 8	62.21 34	76.9 8	73.19 163	71.9 14
29.3	14.40 20	55.1 5	47.42 14	54.9 6	61.87 37	77.7 4	71.56 177	73.3 8
Aug. 8.3	14.20 21	55.6 1	47.28 15	55.5 3	61.50 38	78.1 1	69.79 187	74.1 3
18.2	13.99 2	55.7 3	47.13 15	55.8 0	61.12 38	78.0 7	67.92 188	74.4 3
28.2	13.78 21	55.4 7	46.98 15	55.8 3	60.74 38	77.3 12	66.04 183	74.1 8
Sept. 7.2	13.57 20	54.7 12	46.83 15	55.5 5	60.36 36	76.1 17	64.21 171	73.3 14
17.2	13.37 18	53.5 16	46.68 13	55.0 8	60.00 33	74.4 21	62.50 149	71.9 19
27.1	13.19 15	51.9 20	46.55 10	54.2 12	59.67 28	72.3 26	61.01 124	70.0 24
Oct. 7.1	13.04 11	49.9 24	46.45 6	53.0 15	59.39 23	69.7 29	59.77 90	67.6 27
17.1	12.93 7	47.5 27	46.39 3	51.5 17	59.16 16	66.8 33	58.87 51	64.9 28
27.0	12.86 1	44.8 29	46.36 2	49.8 20	59.00 9	63.5 36	58.36 11	62.1 30
Nov. 6.0	12.85 5	41.9 32	46.38 7	47.8 22	58.91 1	59.9 37	58.25 33	59.1 31
16.0	12.90 10	38.7 33	46.45 12	45.6 24	58.90 8	56.2 38	58.58 77	56.0 29
26.0	13.00 16	35.4 34	46.57 17	43.2 25	58.98 16	52.4 38	59.35 118	53.1 27
Dec. 5.9	13.16 22	32.0 34	46.74 21	40.7 26	59.14 25	48.6 37	60.53 155	50.4 24
15.9	13.38 27	28.6 32	46.95 25	38.1 26	59.39 32	44.9 35	62.08 189	48.0 19
25.9	13.65 30	25.4 30	47.20 29	35.5 25	59.71 39	41.4 31	63.97 216	46.1 15
35.9	13.95	22.4	47.49	33.0	60.10	38.3	66.13	44.6
Sec δ , Tan δ	1.263	+0.772	1.039	+0.282	1.957	+1.682	9.864	-9.813
Mean Place	12 ^h .230	54 ^m .38	45 ^h .203	59 ^m .90	59 ^h .659	73 ^m .66	63 ^h .25*	40 ^m .11
D' ψ α , D ω α	-0.02	+0.03	-0.01	+0.01	-0.03	+0.07	+0.20	-0.41
D ψ δ , D ω δ	-0.3	-0.8	-0.3	-0.8	-0.3	-0.8	-0.3	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Libræ. Mag. 5.6		β Coronæ Borealis. Mag. 3.7		ν¹ Boötis. Mag. 5.2		γ Lupi (mean). Mag. 3.0	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 15 23	° ' - 16 24	h m 15 24	° ' + 29 23	h m 15 27	° ' + 41 7	h m 15 29	° ' - 40 52
Jan. 0.9	19.69	53.2	13.61	63.2	47.28	27.5	18.63	28.5
10.8	20.01 32	54.6 14	13.92 31	60.5 27	47.61 33	24.6 29	19.02 39	28.8 3
20.8	20.35 34	56.0 14	14.25 33	58.1 24	47.97 36	22.1 25	19.43 41	29.5 7
30.8	20.69 34	57.5 15	14.59 34	56.1 20	48.34 37	20.1 20	19.85 42	30.4 9
Feb. 9.8	21.03 34	59.0 15	14.94 35	54.6 15	48.72 38	18.7 14	20.27 42	31.5 11
	33	14	34	10	37	8	41	13
19.7	21.36	60.4	15.28	53.6	49.09	17.9	20.68	32.8
Mar. 1.7	21.68 32	61.7 13	15.60 32	53.2 4	49.45 36	17.7 2	21.07 39	34.3 15
11.7	21.98 30	62.8 11	15.90 30	53.3 1	49.79 34	18.1 4	21.44 37	35.9 16
21.6	22.25 27	63.8 10	16.18 28	54.0 7	50.10 31	19.0 9	21.78 34	37.6 17
31.6	22.50 25	64.6 8	16.43 25	55.1 11	50.37 27	20.4 14	22.10 32	39.3 17
	22	6	21	15	23	19	28	17
Apr. 10.6	22.72	65.2	16.64	56.6	50.60	22.3	22.38	41.0
20.6	22.91 19	65.7 5	16.82 18	58.4 18	50.79 19	24.6 23	22.63 25	42.7 17
30.5	23.07 16	66.1 4	16.96 14	60.4 20	50.94 15	27.1 25	22.84 21	44.4 17
May 10.5	23.21 14	66.3 2	17.07 11	62.6 22	51.05 11	29.7 26	23.02 18	46.0 16
20.5	23.32 11	66.4 1	17.14 7	64.9 23	51.11 6	32.4 27	23.16 14	47.6 16
	8	0	4	23	2	27	10	14
30.5	23.40	66.4	17.18	67.2	51.13	35.1	23.26	49.0
June 9.4	23.45 5	66.4 0	17.18 0	69.4 22	51.11 2	37.7 26	23.31 5	50.3 13
19.4	23.46 1	66.3 1	17.15 3	71.4 20	51.05 6	40.0 23	23.32 1	51.5 12
29.4	23.44 2	66.2 1	17.08 7	73.2 18	50.95 10	42.1 21	23.29 3	52.5 10
July 9.3	23.39 5	66.0 2	16.98 10	74.8 16	50.81 14	43.8 17	23.22 7	53.3 8
	7	2	12	13	16	14	10	6
19.3	23.32 10	65.8 3	16.86 15	76.1 9	50.65 19	45.2 10	23.12 14	53.9 3
29.3	23.22 12	65.5 3	16.71 16	77.0 6	50.46 21	46.2 6	22.98 16	54.2 1
Aug. 8.3	23.10 14	65.2 4	16.55 18	77.6 2	50.25 23	46.8 1	22.82 18	54.3 2
18.2	22.96 15	64.8 4	16.37 19	77.8 2	50.02 23	46.9 3	22.64 20	54.1 4
28.2	22.81 14	64.4 4	16.18 18	77.6 6	49.79 23	46.6 8	22.44 20	53.7 7
Sept. 7.2	22.67 13	64.0 4	16.00 17	77.0 9	49.56 22	45.8 12	22.24 18	53.0 9
17.2	22.54 12	63.6 4	15.83 16	76.1 13	49.34 20	44.6 17	22.06 16	52.1 11
27.1	22.42 9	63.2 3	15.67 13	74.8 17	49.14 17	42.9 20	21.90 12	51.0 13
Oct. 7.1	22.33 5	62.9 2	15.54 9	73.1 20	48.97 13	40.9 24	21.78 8	49.7 14
17.1	22.28 1	62.7 0	15.45 5	71.1 23	48.84 8	38.5 28	21.70 2	48.3 13
27.0	22.27 4	62.7 1	15.40 0	68.8 26	48.76 2	35.7 31	21.68 4	47.0 13
Nov. 6.0	22.31 9	62.8 3	15.40 5	66.2 29	48.74 3	32.6 33	21.72 10	45.7 12
16.0	22.40 14	63.1 5	15.45 11	63.3 30	48.77 9	29.3 34	21.82 16	44.5 10
26.0	22.54 20	63.6 8	15.56 16	60.3 31	48.86 15	25.9 35	21.98 23	43.5 7
Dec. 5.9	22.74 24	64.4 9	15.72 21	57.2 31	49.01 21	22.4 34	22.21 29	42.8 5
15.9	22.98 28	65.3 11	15.93 25	54.1 30	49.22 26	19.0 33	22.50 34	42.3 2
25.9	23.26 30	66.4 13	16.18 29	51.1 29	49.48 31	15.7 31	22.84 37	42.1 1
35.9	23.56	67.7	16.47	48.2	49.79	12.6	23.21	42.2
Sec δ, Tan δ	1.043	-0.295	1.148	+0.563	1.327	+0.873	1.323	-0.866
Mean Place	20°.839	49''.92	14°.527	78''.15	48°.261	44''.80	20°.282	30''.87
D' α, D α	+0.01	-0.01	-0.01	+0.02	-0.02	+0.04	+0.02	-0.04
D' δ, D δ	-0.3	-0.8	-0.3	-0.8	-0.2	-0.8	-0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Libræ. Mag. 4.0		α Coronæ Borealis. Mag. 2.3		ζ Cor. Bor. seq. Mag. 5.1		α Serpentis. Mag. 2.8	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 15 30	° ' -14 29	h m 15 30	° ' +26 59	h m 15 36	° ' +36 54	h m 15 39	° ' + 6 41
	s	"	s	"	s	"	s	"
Jan. 0.9	38.29	63.8	59.28	70.2	5.10	47.4	57.86	45.5
10.8	38.60 31	65.2 14	59.58 30	67.5 27	5.41 31	44.5 29	58.15 29	43.4 21
20.8	38.93 33	66.7 15	59.91 33	65.1 24	5.75 34	42.0 25	58.46 31	41.4 20
30.8	39.27 34	68.2 15	60.25 34	63.1 20	6.11 36	40.0 20	58.78 32	39.6 18
Feb. 9.8	39.61 34	69.6 14	60.59 34	61.6 15	6.47 36	38.5 15	59.10 32	38.0 16
	33	13	33	10	36	9	31	12
19.7	39.94	70.9	60.92	60.6	6.83	37.6	59.41	36.8
Mar. 1.7	40.25 31	72.1 12	61.24 32	60.1 5	7.18 35	37.2 4	59.72 31	35.9 5
11.7	40.55 30	73.2 11	61.54 30	60.1 0	7.50 32	37.4 2	60.01 29	35.4 5
21.7	40.83 28	74.1 9	61.82 28	60.6 5	7.80 30	38.2 8	60.28 27	35.2 2
31.6	41.08 25	74.8 7	62.07 25	61.6 10	8.07 27	39.5 13	60.52 24	35.4 2
	23	5	22	14	23	17	22	5
Apr. 10.6	41.31	75.3	62.29	63.0	8.30	41.2	60.74	35.9 8
20.6	41.51 20	75.7 4	62.47 18	64.7 17	8.50 20	43.3 21	60.93 19	36.7 8
30.5	41.68 17	75.9 2	62.62 15	66.7 20	8.66 16	45.6 23	61.09 16	37.7 10
May 10.5	41.82 14	76.0 1	62.74 12	68.8 21	8.78 12	48.1 25	61.23 14	38.8 11
20.5	41.93 11	76.0 0	62.82 8	71.0 22	8.85 7	50.7 26	61.34 11	40.0 12
	8	1	5	22	3	26	7	13
30.5	42.01	75.9	62.87	73.2	8.88	53.3	61.41	41.3 13
June 9.4	42.06 5	75.7 2	62.88 1	75.3 21	8.88 0	55.8 25	61.45 4	42.6 13
19.4	42.08 2	75.5 2	62.86 2	77.3 20	8.84 4	58.1 23	61.47 2	43.9 13
29.4	42.07 1	75.3 2	62.80 6	79.1 18	8.76 8	60.1 20	61.46 1	45.1 12
July 9.4	42.03 4	75.0 3	62.71 9	80.6 15	8.65 11	61.9 18	61.41 5	46.2 11
	7	3	11	13	14	14	8	9
19.3	41.96	74.7	62.60	81.9	8.51	63.3	61.33	47.1 7
29.3	41.86 10	74.4 3	62.47 13	82.9 10	8.34 17	64.4 11	61.23 10	47.8 7
Aug. 8.3	41.74 12	74.1 3	62.31 16	83.5 6	8.15 19	65.1 7	61.11 12	48.4 6
18.2	41.61 13	73.7 4	62.14 17	83.8 3	7.94 21	65.4 3	60.97 14	48.8 4
28.2	41.47 14	73.3 4	61.96 18	83.7 1	7.73 21	65.2 2	60.83 14	49.0 2
	14	3	18	4	21	6	15	0
Sept. 7.2	41.33	73.0	61.78	83.3	7.52	64.6	60.68	49.0 2
17.2	41.19 14	72.7 3	61.61 17	82.5 8	7.31 21	63.6 10	60.54 14	48.8 2
27.1	41.07 12	72.4 3	61.45 16	81.3 12	7.12 19	62.1 15	60.41 13	48.4 4
Oct. 7.1	40.98 9	72.2 2	61.32 13	79.7 16	6.96 16	60.2 19	60.30 11	47.7 7
17.1	40.92 6	72.1 1	61.23 9	77.8 19	6.84 12	58.0 22	60.22 8	46.7 10
	2	1	5	22	8	25	3	12
27.1	40.90	72.2	61.18	75.6	6.76	55.5	60.19	45.5 14
Nov. 6.0	40.93 3	72.4 2	61.17 1	73.1 25	6.73 3	52.6 29	60.20 1	44.1 14
16.0	41.01 8	72.8 4	61.22 5	70.4 27	6.76 3	49.5 31	60.26 6	42.5 16
26.0	41.15 14	73.4 6	61.32 10	67.5 29	6.84 8	46.2 33	60.37 11	40.6 19
Dec. 5.9	41.33 18	74.2 8	61.48 16	64.5 30	6.98 14	42.8 34	60.53 16	38.5 21
	23	10	20	30	20	33	20	21
15.9	41.56	75.2	61.68	61.5	7.18	39.5	60.73	36.4 22
25.9	41.83 27	76.4 12	61.93 25	58.5 30	7.43 25	36.3 32	60.97 24	34.2 22
35.9	42.13 30	77.8 14	62.22 29	55.7 28	7.72 29	33.3 30	61.24 27	32.1 21
Sec δ , Tan δ	1.033	-0.259	1.122	+0.510	1.251	+0.751	1.007	+0.117
Mean Place	39°.447	59''.74	60°.234	84''.71	6°.113	63''.86	58°.890	55''.29
D' ψ α , D ω α	+0.01	-0.01	-0.01	+0.02	-0.02	+0.03	0.00	0.00
D ψ δ , D ω δ	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Serpentina. Mag. 3.7		κ Serpentina. Mag. 4.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m	° '	h m	° '
	15 42	+15 41	15 44	+18 24
	"	"	"	"
Jan. 0.9	9.32	24.3	48.34	21.8
10.8	9.61 29	21.9 24	48.63 29	19.3 25
20.8	9.92 31	19.7 22	48.94 31	17.0 23
30.8	10.24 32	17.7 20	49.26 32	15.0 20
Feb. 9.8	10.57 33	16.1 16	49.58 32	13.4 16
	32	12	32	12
19.7	10.89	14.9	49.90	12.2
Mar. 1.7	11.20 31	14.2 7	50.21 31	11.5 7
11.7	11.49 29	13.9 3	50.51 30	11.3 2
21.7	11.76 27	14.0 1	50.79 28	11.5 2
31.6	12.01 25	14.5 5	51.04 25	12.1 6
	22	9	22	10
Apr. 10.6	12.23	15.4	51.26	13.1
20.6	12.42 19	16.6 12	51.45 19	14.4 13
30.5	12.58 16	18.1 15	51.62 17	16.0 16
May 10.5	12.71 13	19.7 16	51.75 13	17.7 17
20.5	12.81 10	21.4 17	51.85 10	19.5 18
	7	18	7	19
30.5	12.88	23.2	51.92	21.4
June 9.4	12.92 4	24.9 17	51.96 4	23.3 19
19.4	12.93 1	26.5 16	51.97 1	25.1 18
29.4	12.91 2	28.0 15	51.94 3	26.7 16
July 9.4	12.85 6	29.4 14	51.88 6	28.1 14
	9	12	9	12
19.3	12.76	30.6	51.79	29.3
29.3	12.65 11	31.5 9	51.67 12	30.3 10
Aug. 8.3	12.52 13	32.1 6	51.53 14	31.0 7
18.2	12.37 15	32.5 4	51.38 15	31.4 4
28.2	12.21 16	32.6 1	51.22 16	31.6 2
	16	1	16	2
Sept. 7.2	12.05	32.5	51.06	31.4
17.2	11.90 15	32.1 4	50.90 16	30.9 5
27.1	11.76 14	31.3 8	50.75 15	30.1 8
Oct. 7.1	11.64 12	30.2 11	50.62 13	28.9 12
17.1	11.56 8	28.9 13	50.53 9	27.4 15
	5	16	5	17
27.1	11.51	27.3	50.48	25.7
Nov. 6.0	11.51 0	25.4 19	50.47 1	23.7 20
16.0	11.55 4	23.3 21	50.51 4	21.4 23
26.0	11.65 10	21.0 23	50.61 10	18.9 25
Dec. 5.9	11.80 15	18.5 25	50.75 14	16.3 26
	20	26	19	27
15.9	12.00	15.9	50.94	13.6
25.9	12.24 24	13.3 26	51.18 24	11.0 26
35.9	12.51 27	10.8 25	51.45 27	8.4 26
Sec δ , Tan δ	1.039	+0.281	1.054	+0.333
Mean Place	10 ^h .340	36 ^m .23	49 ^h .366	34 ^m .32
D ₁ α , D ₂ α	-0.01	+0.01	-0.01	+0.01
D ₁ δ , D ₂ δ	-0.2	-0.8	-0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Serpentis. Mag. 3.8		ζ Ursæ Minoris. Mag. 4.3		β Triang. Aust. Mag. 3.0		λ Libræ. Mag. 5.1	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.
	h m 15 46 s	° ' " + 4 43 "	h m 15 47 s	° ' " +78 3 "	h m 15 47 s	° ' " -63 9 "	h m 15 48 s	° ' " -19 54 "
Jan. 0.9	27.60	71.3	5.24	24.6	24.97	42.6	15.55	31.7
10.9	27.88 28	69.2 21	6.00 76	21.7 29	25.55 58	41.8 8	15.86 31	32.8 11
20.8	28.19 31	67.2 20	6.90 90	19.3 24	26.17 62	41.5 3	16.19 33	34.0 12
30.8	28.51 32	65.4 18	7.91 101	17.5 18	26.81 64	41.6 1	16.54 35	35.3 13
Feb. 9.8	28.83 32	63.9 15	8.99 108	16.3 12	27.46 65	42.1 5	16.89 35	36.6 13
19.7	29.15	62.7	10.09	15.8	28.11	43.0	17.23	37.8
Mar. 1.7	29.46 31	61.8 9	11.17 108	16.0 2	28.74 63	44.3 13	17.56 33	38.9 11
11.7	29.75 29	61.2 6	12.20 103	16.8 8	29.34 60	45.9 16	17.87 31	40.0 11
21.7	30.02 27	61.0 2	13.15 95	18.2 14	29.91 57	47.8 19	18.16 29	41.0 10
31.6	30.27 25	61.1 1	13.98 83	20.2 20	30.43 52	49.9 21	18.43 27	41.8 8
10.6	30.49	61.5	14.67	22.6	30.90	52.2	18.68	42.5
20.6	30.69 20	62.2 7	15.19 52	25.4 28	31.32 42	54.6 24	18.90 22	43.0 5
30.6	30.86 17	63.1 9	15.54 35	28.4 30	31.68 36	57.2 26	19.10 20	43.4 4
May 10.5	31.00 14	64.2 11	15.70 16	31.5 31	31.97 29	59.8 26	19.27 17	43.8 4
20.5	31.12 12	65.4 12	15.67 3	34.7 32	32.19 22	62.4 26	19.40 13	44.1 3
30.5	31.20	66.6	15.47	37.8	32.34	65.0	19.50	44.3
June 9.4	31.25 5	67.8 12	15.10 37	40.7 29	32.42 8	67.5 25	19.57 7	44.4 1
19.4	31.27 2	69.0 12	14.57 53	43.4 27	32.42 0	69.8 23	19.61 4	44.5 1
29.4	31.26 1	70.1 11	13.89 68	45.7 23	32.35 7	71.8 20	19.61 0	44.5 0
July 9.4	31.22 4	71.1 10	13.09 80	47.6 19	32.20 15	73.6 18	19.58 3	44.5 0
19.3	31.15	72.0	12.18	49.0	31.99	75.1	19.52	44.4
29.3	31.06 9	72.7 7	11.18 100	50.0 10	31.72 27	76.2 11	19.43 9	44.2 2
Aug. 8.3	30.94 12	73.3 6	10.12 106	50.5 5	31.41 31	76.9 7	19.31 12	44.0 2
18.3	30.80 14	73.7 4	9.02 110	50.4 1	31.06 35	77.2 3	19.17 14	43.7 3
28.2	30.65 15	74.0 3	7.91 111	49.8 6	30.69 37	77.0 2	19.02 15	43.4 3
7.2	30.50	74.1	6.82	48.7	30.32	76.4	18.87	43.0
17.2	30.36 14	73.9 2	5.76 106	47.1 16	29.97 35	75.4 10	18.72 15	42.6 4
27.1	30.23 13	73.5 4	4.76 100	45.0 21	29.65 32	73.9 15	18.58 14	42.2 4
Oct. 7.1	30.12 11	72.9 6	3.85 91	42.5 25	29.38 27	72.1 18	18.47 11	41.8 4
17.1	30.04 8	72.1 8	3.06 79	39.7 28	29.18 20	70.1 20	18.40 7	41.5 3
27.1	30.00	71.0	2.42	36.5	29.07	67.9	18.37	41.3
Nov. 6.0	30.01 1	69.7 13	1.93 49	33.0 35	29.06 1	65.6 23	18.39 2	41.2 1
16.0	30.07 6	68.2 15	1.62 31	29.3 37	29.15 9	63.2 24	18.46 7	41.2 0
26.0	30.17 10	66.5 17	1.51 11	25.5 38	29.34 19	61.0 22	18.58 12	41.4 2
Dec. 6.0	30.32 15	64.6 19	1.60 9	21.7 38	29.64 30	59.0 20	18.75 17	41.8 4
15.9	30.52	62.6	1.89	18.0	30.03	57.2	18.97	42.4
25.9	30.76 24	60.5 21	2.37 48	14.5 35	30.50 47	55.8 14	19.23 26	43.2 8
35.9	31.03 27	58.4 21	3.03 66	11.4 31	31.04 54	54.7 11	19.53 30	44.2 10
Sec δ, Tan δ	1.003	+0.083	4.833	+4.728	2.215	-1.977	1.064	-0.362
Mean Place	28°.671	80'' .67	8°.506	45'' .33	27°.977	47'' .51	16°.841	28'' .28
D'ψ α, Dω α	0.00	0.00	-0.10	+0.17	+0.04	-0.07	+0.01	-0.01
Dψ δ, Dω δ	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8	-0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Serpentis. Mag. 3.9		π Scorpii. Mag. 3.0		ϵ Coronæ Borealis. Mag. 4.2		δ Scorpii. Mag. 2.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 15 52	° ' +15 56	h m 15 53	° ' -25 51	h m 15 53	° ' +27 7	h m 15 55	° ' -22 22
	s	"	s	"	s	"	s	"
Jan. 0.9	24.96	29.7	33.74	54.2	58.00	30.7	9.81	32.8
10.9	25.24 28	27.2 25	34.07 33	55.0 8	58.28 28	27.9 28	10.12 31	33.7 9
20.8	25.55 31	24.9 23	34.42 35	56.0 10	58.59 31	25.4 25	10.46 34	34.8 11
30.8	25.87 32	22.9 20	34.78 36	57.1 11	58.92 33	23.3 21	10.81 35	35.9 11
Feb. 9.8	26.19 32	21.3 16	35.14 36	58.2 11	59.26 34	21.7 16	11.16 35	37.1 12
	32	12	35	12	33	11	35	12
19.7	26.51	20.1	35.49	59.4	59.59	20.6	11.51	38.3
Mar. 1.7	26.82 31	19.3 8	35.83 34	60.5 11	59.91 32	19.9 7	11.85 34	39.4 11
11.7	27.12 30	18.9 4	36.16 33	61.6 11	60.22 31	19.8 1	12.17 32	40.4 10
21.7	27.40 28	18.9 0	36.47 31	62.7 11	60.51 29	20.2 4	12.47 30	41.4 10
31.6	27.65 25	19.4 5	36.76 29	63.7 10	60.77 26	21.1 9	12.75 28	42.3 9
	23	9	26	9	24	14	25	8
Apr. 10.6	27.88	20.3	37.02	64.6	61.01	22.5	13.00	43.1
20.6	28.08 20	21.5 12	37.25 23	65.4 8	61.22 21	24.2 17	13.23 23	43.7 6
30.6	28.25 17	22.9 14	37.46 21	66.2 8	61.39 17	26.1 19	13.44 21	44.2 5
May 10.5	28.39 14	24.5 16	37.64 18	66.9 7	61.53 14	28.2 21	13.62 18	44.7 5
20.5	28.50 11	26.2 17	37.79 15	67.5 6	61.63 10	30.5 23	13.76 14	45.1 4
	8	18	12	5	7	23	11	3
30.5	28.58	28.0	37.91	68.0	61.70	32.8	13.87	45.4
June 9.4	28.63 5	29.8 18	37.99 8	68.5 5	61.73 3	35.1 23	13.95 8	45.7 3
19.4	28.65 2	31.5 17	38.03 4	68.9 4	61.73 0	37.2 21	14.00 5	45.9 2
29.4	28.63 2	33.0 15	38.03 0	69.2 3	61.69 4	39.1 19	14.01 1	46.0 1
July 9.4	28.58 5	34.3 13	38.00 3	69.4 2	61.62 7	40.8 17	13.98 3	46.1 1
	8	12	6	2	10	15	6	0
19.3	28.50	35.5	37.94	69.6	61.52	42.3	13.92	46.1
29.3	28.39 11	36.5 10	37.84 10	69.7 1	61.39 13	43.5 12	13.83 9	46.0 1
Aug. 8.3	28.26 13	37.2 7	37.72 12	69.6 1	61.23 16	44.3 8	13.71 12	45.9 1
18.3	28.11 15	37.6 4	37.58 14	69.4 2	61.06 17	44.7 4	13.57 14	45.7 2
28.2	27.95 16	37.7 1	37.42 16	69.1 3	60.88 18	44.8 1	13.42 15	45.4 3
	16	1	16	4	19	3	16	4
Sept. 7.2	27.79	37.6	37.26	68.7	60.69	44.5	13.26	45.0
17.2	27.63 16	37.2 4	37.10 16	68.2 5	60.50 19	43.9 6	13.10 16	44.6 4
27.1	27.48 15	36.4 8	36.96 14	67.6 6	60.33 17	42.9 10	12.96 14	44.1 5
Oct. 7.1	27.36 12	35.3 11	36.84 12	67.0 6	60.18 15	41.5 14	12.85 11	43.6 5
17.1	27.27 9	34.0 13	36.76 8	66.4 6	60.07 11	39.8 17	12.77 8	43.2 4
	6	16	4	6	7	21	4	4
27.1	27.21	32.4	36.72	65.8	60.00	37.7	12.73	42.8
Nov. 6.0	27.20 1	30.5 19	36.73 1	65.3 5	59.97 3	35.3 24	12.74 1	42.5 3
16.0	27.24 4	28.4 21	36.79 6	65.0 3	59.99 2	32.7 26	12.80 6	42.4 1
26.0	27.33 9	26.0 24	36.91 12	64.9 1	60.06 7	29.8 29	12.92 12	42.5 1
Dec. 6.0	27.47 14	23.5 25	37.09 18	64.9 0	60.19 13	26.8 30	13.09 17	42.8 3
	18	26	23	2	18	30	22	4
15.9	27.65	20.9	37.32	65.1	60.37	23.8	13.31	43.2
25.9	27.88 23	18.3 26	37.59 27	65.5 4	60.59 22	20.8 30	13.57 26	43.8 6
35.9	28.14 26	15.8 25	37.90 31	66.2 7	60.86 27	18.0 28	13.87 30	44.6 8
Sec δ , Tan δ	1.040	+0.286	1.111	-0.485	1.124	+0.512	1.081	-0.412
Mean Place	26°.028	41''.73	35°.147	51''.93	59°.079	45''.05	11°.162	29''.55
D' α , D $_{\infty}$ α	-0.01	+0.01	+0.01	-0.02	-0.01	+0.02	+0.01	-0.01
D' δ , D $_{\infty}$ δ	-0.2	-0.8	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Draconis. Mag. 4.1		β Scorpil. Mag. 2.9		κ Herculis. Mag. 5.3		ϕ Herculis. Mag. 4.3	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 16 0	° ' +58 47	h m 16 0	° ' -19 34	h m 16 4	° ' +17 16	h m 16 6	° ' +45 9
	s "	"	s "	"	s "	"	s "	"
Jan. 0.9	13.90	31.5	21.18	9.0	7.70	28.0	0.40	28.0
10.9	14.26 36	28.3 32	21.48 30	10.1 11	7.97 27	25.5 25	0.70 30	24.9 31
20.8	14.68 42	25.6 27	21.81 33	11.2 11	8.27 30	23.2 23	1.04 34	22.2 27
30.8	15.14 46	23.4 22	22.15 34	12.4 12	8.58 31	21.2 20	1.41 37	19.9 23
Feb. 9.8	15.62 48	21.8 16	22.49 34	13.6 12	8.90 32	19.6 16	1.79 38	18.2 17
	49	9	34	11	32	13	39	11
19.8	16.11	20.9	22.83	14.7	9.22	18.3	2.18	17.1
Mar. 1.7	16.60 49	20.7 2	23.16 33	15.8 11	9.54 32	17.5 8	2.56 38	16.6 5
11.7	17.07 47	21.1 4	23.48 32	16.8 10	9.84 30	17.2 3	2.93 37	16.7 1
21.7	17.50 43	22.2 11	23.78 30	17.7 9	10.12 28	17.3 1	3.28 35	17.5 8
31.6	17.89 39	23.8 16	24.06 28	18.4 7	10.38 26	17.9 6	3.60 32	18.9 14
	34	21	26	6	24	9	28	18
Apr. 10.6	18.23	25.9	24.32	19.0	10.62	18.8	3.88	20.7
20.6	18.51 28	28.5 26	24.55 23	19.5 5	10.83 21	20.1 13	4.12 24	22.9 22
30.6	18.73 22	31.4 29	24.76 21	19.9 4	11.01 18	21.6 15	4.32 20	25.4 25
May 10.5	18.88 15	34.5 31	24.94 18	20.2 3	11.16 15	23.3 17	4.47 15	28.2 28
20.5	18.96 8	37.7 32	25.09 15	20.4 2	11.28 12	25.2 19	4.57 10	31.1 29
	2	31	11	1	9	19	6	29
30.5	18.98	40.8	25.20	20.5	11.37	27.1	4.63	34.0
June 9.5	18.93 5	43.8 30	25.28 8	20.6 1	11.43 6	29.0 19	4.64 1	36.8 28
19.4	18.81 12	46.6 28	25.33 5	20.6 0	11.45 2	30.8 18	4.60 4	39.5 27
29.4	18.64 17	49.1 25	25.34 1	20.6 0	11.44 1	32.5 17	4.52 8	42.0 25
July 9.4	18.41 23	51.3 22	25.32 2	20.6 0	11.39 5	34.0 15	4.39 13	44.2 22
	28	18	6	1	8	13	16	18
19.3	18.13	53.1	25.26	20.5	11.31	35.3	4.23	46.0
29.3	17.81 32	54.4 13	25.17 9	20.3 2	11.21 10	36.4 11	4.03 20	47.4 14
Aug. 8.3	17.45 36	55.3 9	25.06 11	20.1 2	11.08 13	37.2 8	3.80 23	48.4 10
18.3	17.07 38	55.7 4	24.92 14	19.9 2	10.93 15	37.7 5	3.55 25	48.9 5
28.2	16.67 40	55.6 1	24.77 15	19.6 3	10.77 16	38.0 3	3.29 26	49.0 1
	40	6	16	3	17	1	27	4
Sept. 7.2	16.27	55.0	24.61	19.3	10.60	37.9	3.02	48.6
17.2	15.88 39	53.8 12	24.46 15	19.0 3	10.43 17	37.5 4	2.75 27	47.7 9
27.2	15.52 36	52.1 17	24.32 14	18.6 4	10.27 16	36.8 7	2.50 25	46.3 14
Oct. 7.1	15.19 33	50.0 21	24.21 11	18.2 4	10.14 13	35.8 10	2.28 22	44.5 18
17.1	14.90 29	47.4 26	24.13 8	17.9 3	10.03 11	34.5 13	2.09 19	42.3 22
	23	29	4	2	7	16	15	26
27.1	14.67	44.5	24.09	17.7	9.96	32.9	1.94	39.7
Nov. 6.0	14.51 16	41.2 33	24.09 0	17.6 1	9.94 2	31.0 19	1.85 9	36.7 30
16.0	14.43 8	37.7 35	24.14 5	17.6 0	9.97 3	28.9 21	1.82 3	33.5 32
26.0	14.44 1	34.0 37	24.25 11	17.8 2	10.04 7	26.6 23	1.85 3	30.1 34
Dec. 6.0	14.53 9	30.2 38	24.41 16	18.2 4	10.16 12	24.1 25	1.95 10	26.6 35
	17	37	21	6	17	26	16	35
15.9	14.70	26.5	24.62	18.8	10.33	21.5	2.11	23.1
25.9	14.95 25	22.9 36	24.87 25	19.6 8	10.55 22	18.9 26	2.33 22	19.6 35
35.9	15.27 32	19.5 34	25.16 29	20.5 9	10.81 26	16.3 26	2.60 27	16.3 33
Sec δ , Tan δ	1.930	+1.651	1.061	-0.356	1.047	+0.311	1.418	+1.006
Mean Place	15 ^s .491	50 ^{''} .44	22 ^s .506	4 ^{''} .95	8 ^s .817	40 ^{''} .34	1 ^s .705	45 ^{''} .21
D ψ α , D ω α	-0.04	+0.06	+0.01	-0.01	-0.01	+0.01	-0.02	+0.03
D ψ δ , D ω δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombridge 2320. Mag. 5.4		δ ¹ Apodis. Mag. 4.8		δ Ophiuchi. Mag. 3.0		σ Cor. Bor. seq. Mag. 5.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	<div>h m</div> <div>16 6</div>	<div>° '</div> <div>+68 1</div>	<div>h m</div> <div>16 7</div>	<div>° '</div> <div>−78 28</div>	<div>h m</div> <div>16 9</div>	<div>° '</div> <div>− 3 28</div>	<div>h m</div> <div>16 11</div>	<div>° '</div> <div>+34 4</div>
	<div>s</div> <div>"</div>	<div>s</div> <div>"</div>	<div>s</div> <div>"</div>	<div>s</div> <div>"</div>	<div>s</div> <div>"</div>	<div>s</div> <div>"</div>	<div>s</div> <div>"</div>	<div>s</div> <div>"</div>
Jan. 0.9	2.67	61.6	11.32	37.6	45.88	23.6	23.99	27.8
10.9	3.11 44	58.4 32	12.43 111	36.0 16	46.16 28	25.3 17	24.27 28	24.9 29
20.8	3.63 52	55.7 27	13.66 123	34.9 11	46.46 30	26.9 16	24.58 31	22.3 26
30.8	4.21 58	53.5 22	14.98 132	34.3 6	46.77 31	28.5 16	24.91 33	20.0 23
Feb. 9.8	4.83 62	52.0 15	16.35 137	34.2 1	47.09 32	29.9 14	25.25 34	18.2 18
	64	9	138	4	32	12	35	12
19.8	5.47	51.1	17.73	34.6	47.41	31.1	25.60	17.0
Mar. 1.7	6.11 64	50.9 2	19.10 137	35.5 9	47.72 31	32.1 10	25.94 34	16.4 6
11.7	6.73 62	51.4 5	20.42 132	36.8 13	48.02 30	32.8 7	26.26 32	16.3 1
21.7	7.31 58	52.5 11	21.68 126	38.5 17	48.31 29	33.2 4	26.57 31	16.8 5
31.6	7.83 52	54.2 17	22.86 118	40.5 20	48.58 27	33.3 1	26.86 29	17.8 10
	45	22	107	24	24	1	26	15
Apr. 10.6	8.28	56.4	23.93	42.9	48.82	33.2	27.12	19.3
20.6	8.65 37	59.0 26	24.88 95	45.5 26	49.04 22	32.9 3	27.35 23	21.2 19
30.6	8.93 28	62.0 30	25.69 81	48.4 29	49.24 20	32.4 5	27.54 19	23.4 22
May 10.5	9.11 18	65.1 31	26.35 66	51.4 30	49.41 17	31.7 7	27.69 15	25.8 24
20.5	9.19 8	68.3 32	26.84 49	54.5 31	49.55 14	30.9 8	27.81 12	28.4 26
	2	32	32	31	11	8	8	26
30.5	9.17	71.5	27.16	57.6	49.66	30.1	27.89	31.0
June 9.5	9.06 11	74.6 31	27.31 15	60.6 30	49.74 8	29.3 8	27.93 4	33.6 26
19.4	8.86 20	77.5 29	27.28 3	63.5 29	49.79 5	28.5 8	27.93 0	36.0 24
29.4	8.58 28	80.1 26	27.07 21	66.2 27	49.80 1	27.7 8	27.89 4	38.2 22
July 9.4	8.22 36	82.3 22	26.69 38	68.6 24	49.78 2	26.9 8	27.81 8	40.2 20
	43	18	53	21	5	7	12	17
19.3	7.79	84.1	26.16	70.7	49.73	26.2	27.69	41.9
29.3	7.30 49	85.4 13	25.49 67	72.4 17	49.65 8	25.6 6	27.54 15	43.3 14
Aug. 8.3	6.77 53	86.3 9	24.71 78	73.7 13	49.54 11	25.1 5	27.37 17	44.4 11
18.3	6.21 56	86.7 4	23.85 86	74.5 8	49.41 13	24.7 4	27.18 19	45.0 6
28.2	5.63 58	86.5 2	22.93 92	74.7 2	49.26 15	24.4 3	26.97 21	45.2 2
	59	7	93	4	15	2	22	2
Sept. 7.2	5.04	85.8	22.00	74.3	49.11	24.2	26.75	45.0
17.2	4.46 58	84.6 12	21.10 90	73.4 9	48.96 15	24.1 1	26.54 21	44.4 6
27.2	3.91 55	82.9 17	20.26 84	72.0 14	48.82 14	24.2 1	26.34 20	43.3 11
Oct. 7.1	3.41 50	80.7 22	19.53 73	70.2 18	48.70 12	24.4 2	26.16 18	41.8 15
17.1	2.97 44	78.1 26	18.94 59	68.0 22	48.61 9	24.8 4	26.01 15	40.0 18
	36	30	41	25	5	6	11	22
27.1	2.61	75.1	18.53	65.5	48.56	25.4	25.90	37.8
Nov. 6.0	2.34 27	71.8 33	18.32 21	62.7 28	48.55 1	26.2 8	25.83 7	35.2 26
16.0	2.17 17	68.2 36	18.33 1	59.8 29	48.59 4	27.2 10	25.82 1	32.4 28
26.0	2.11 6	64.4 38	18.56 23	56.9 29	48.68 9	28.4 12	25.87 5	29.3 31
Dec. 6.0	2.16 5	60.6 38	19.02 46	54.1 28	48.81 13	29.8 14	25.97 10	26.1 32
	17	37	67	25	18	15	15	32
15.9	2.33	56.9	19.69	51.6	48.99	31.3	26.12	22.9
25.9	2.61 28	53.3 36	20.55 86	49.4 22	49.22 23	32.9 16	26.33 21	19.7 32
35.9	2.99 38	49.9 34	21.58 103	47.5 19	49.48 26	34.6 17	26.59 26	16.6 31
Sec δ, Tan δ	2.673	+2.479	5.008	−4.907	1.002	−0.061	1.207	+0.676
Mean Place	4 ^s .861	81 ^{''} .02	18 ^s .308	42 ^{''} .43	47 ^s .090	15 ^{''} .58	25 ^s .205	43 ^{''} .24
D'ψ α, D _α α	−0.06	+0.08	+0.11	−0.16	0.00	0.00	−0.02	+0.02
Dψ δ, D _δ δ	−0.2	−0.9	−0.2	−0.9	−0.2	−0.9	−0.2	−0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Herculis. Mag. 3.9		γ Herculis. Mag. 3.8		η Ursæ Minoris. Mag. 5.0		γ Apodis. Mag. 3.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 16 17	° ' +46 30	h m 16 18	° ' +19 21	h m 16 19	° ' +75 56	h m 16 19	° ' -78 42
	s	"	s	"	s	"	s	"
Jan. 0.9	6.13	55.1	3.71	11.5	58.32	63.4	57.00	9.7
10.9	6.42 29	51.9 32	3.97 26	8.9 26	58.88 56	60.2 32	58.09 109	7.9 18
20.8	6.76 34	49.1 28	4.26 29	6.5 24	59.57 69	57.4 28	59.32 123	6.6 13
30.8	7.13 37	46.7 24	4.57 31	4.5 20	60.37 80	55.2 22	60.64 132	5.8 8
Feb. 9.8	7.51 38	44.9 18	4.89 32	2.8 17	61.25 88	53.6 16	62.02 138	5.5 3
	39	12	32	13	93	10	141	2
19.8	7.90	43.7 6	5.21	1.5 8	62.18	52.6 3	63.43 140	5.7 6
Mar. 1.7	8.29 39	43.1 1	5.53 32	0.7 3	63.12 94	52.3 4	64.83 137	6.3 11
11.7	8.67 38	43.2 7	5.83 29	0.4 1	64.04 87	53.7 10	66.20 131	7.4 15
21.7	9.03 36	43.9 13	6.12 27	0.5 6	64.91 79	55.3 16	67.51 123	8.9 19
31.7	9.36 29	45.2 18	6.39 25	1.1 10	65.70 68	55.3 22	68.74 114	10.8 22
Apr. 10.6	9.65	47.0 22	6.64	2.1 13	66.38	57.5 26	69.88 102	13.0 25
20.6	9.91 21	49.2 25	6.86 19	3.4 16	66.94 42	60.1 29	70.90 88	15.5 27
30.6	10.12 17	51.7 28	7.05 17	5.0 19	67.36 27	63.0 31	71.78 73	18.2 29
May 10.5	10.29 12	54.5 30	7.22 14	6.9 20	67.63 12	66.1 32	72.51 57	21.1 30
20.5	10.41 7	57.5 30	7.36 10	8.9 20	67.75 4	69.3 32	73.08 39	24.1 31
30.5	10.48	60.5 29	7.46	10.9 20	67.71	72.5 31	73.47 21	27.2 30
June 9.5	10.50 2	63.4 27	7.52 3	12.9 20	67.52 33	75.6 29	73.68 2	30.2 29
19.4	10.47 8	66.1 26	7.55 0	14.9 18	67.19 47	78.5 27	73.70 16	33.1 28
29.4	10.39 12	68.7 23	7.55 4	16.7 17	66.72 59	81.2 24	73.54 33	35.9 25
July 9.4	10.27 17	71.0 19	7.51 7	18.4 15	66.13 70	83.6 19	73.21 50	38.4 22
19.4	10.10	72.9 16	7.44 11	19.9 12	65.43 80	85.5 15	72.71 65	40.6 18
29.3	9.90 23	74.5 11	7.33 13	21.1 9	64.63 87	87.0 10	72.06 77	42.4 14
Aug. 8.3	9.67 26	75.6 7	7.20 15	22.0 6	63.76 92	88.0 5	71.29 86	43.8 9
18.3	9.41 27	76.3 2	7.05 17	22.6 3	62.84 95	88.5 0	70.43 93	44.7 4
28.2	9.14 28	76.5 3	6.88 17	22.9 0	61.89 96	88.5 6	69.50 95	45.1 1
Sept. 7.2	8.86	76.2 8	6.71	22.9 3	60.93	87.9 11	68.55 94	45.0 7
17.2	8.58 28	75.4 13	6.54 17	22.6 6	59.98 91	86.8 16	67.61 88	44.3 12
27.2	8.31 24	74.1 17	6.37 15	22.0 10	59.07 85	85.2 20	66.73 78	43.1 17
Oct. 7.1	8.07 21	72.4 21	6.22 12	21.0 13	58.22 77	83.2 25	65.95 65	41.4 22
17.1	7.86 17	70.3 25	6.10 9	19.7 16	57.45 66	80.7 29	65.30 48	39.2 25
27.1	7.69	67.8 29	6.01	18.1 19	56.79	77.8 32	64.82 27	36.7 27
Nov. 6.1	7.58 11	64.9 32	5.97 1	16.2 22	56.26 38	74.6 34	64.55 5	34.0 29
16.0	7.53 1	61.7 34	5.98 6	14.0 24	55.88 22	71.2 37	64.50 17	31.1 29
26.0	7.54 8	58.3 36	6.04 11	11.6 26	55.66 4	67.5 38	64.67 40	28.2 28
Dec. 6.0	7.62 15	54.7 36	6.15 16	9.0 27	55.62 13	63.7 37	65.07 63	25.4 26
15.9	7.77	51.1 35	6.31	6.3 27	55.75	60.0 36	65.70 83	22.8 24
25.9	7.98 21	47.6 33	6.51 24	3.6 26	56.05 46	56.4 34	66.53 100	20.4 21
35.9	8.24	44.3	6.75	1.0	56.51	53.0	67.53	18.3
Sec δ , Tan δ	1.453	+1.054	1.060	+0.351	4.120	+3.997	5.107	-5.008
Mean Place	7 ^h .543	72 ^{''} .11	4 ^h .894	24 ^{''} .19	61 ^h .903	82 ^{''} .43	64 ^h .215	13 ^{''} .33
D ^{ϕ} α , D _{α} α	-0.03	+0.03	-0.01	+0.01	-0.10	+0.11	+0.12	-0.14
D ^{ϕ} δ , D _{δ} δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ω Herculis. Mag. 4.5		η Draconis. Mag. 2.9		α Scorpii. Mag. 1.2		β Herculis. Mag. 2.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension	Declination N.
	h m 16 21 s	° ' +14 13 "	h m 16 22 s	° ' +61 42 "	h m 16 24 s	° ' -26 14 "	h m 16 26 s	° ' +21 40 "
Jan. 0.9	22.61	46.7	46.69	20.9	2.73	27.0	27.50	29.3
10.9	22.87 ²⁶	44.3 ²⁴	47.04 ³⁵	17.6 ³³	3.03 ³⁰	27.5 ⁵	27.76 ²⁶	26.7 ²⁶
20.8	23.15 ²⁸	42.1 ²²	47.45 ⁴¹	14.7 ²⁹	3.36 ³³	28.2 ⁷	28.04 ²⁸	24.3 ²⁴
30.8	23.45 ³⁰	40.1 ²⁰	47.91 ⁴⁶	12.3 ²⁴	3.70 ³⁴	29.0 ⁸	28.34 ³⁰	22.2 ²¹
Feb. 9.8	23.77 ³²	38.4 ¹⁷	48.41 ⁵⁰	10.5 ¹⁸	4.06 ³⁶	29.9 ⁹	28.66 ³²	20.4 ¹⁸
19.8	24.09 ³²	37.1 ¹³	48.93 ⁵²	9.4 ¹¹	4.42 ³⁶	30.8 ⁹	28.98 ³²	19.0 ¹⁴
Mar. 1.7	24.40 ³¹	36.3 ⁸	49.46 ⁵³	8.9 ⁵	4.77 ³⁵	31.7 ⁹	29.30 ³²	18.2 ⁸
11.7	24.70 ³⁰	35.9 ⁴	49.97 ⁵¹	9.1 ²	5.11 ³⁴	32.6 ⁹	29.61 ³¹	17.9 ³
21.7	24.99 ²⁹	35.9 ⁰	50.45 ⁴⁸	10.0 ⁹	5.43 ³²	33.4 ⁸	29.91 ³⁰	18.1 ²
31.7	25.26 ²⁷	36.3 ⁴	50.90 ⁴⁵	11.5 ¹⁵	5.74 ³¹	34.2 ⁸	30.19 ²⁸	18.7 ⁶
Apr. 10.6	25.51 ²⁵	37.1 ⁸	51.30 ⁴⁰	13.5 ²⁰	6.03 ²⁹	34.9 ⁷	30.44 ²⁵	19.7 ¹⁰
20.6	25.73 ²²	38.3 ¹²	51.63 ³³	15.9 ²⁴	6.29 ²⁶	35.5 ⁶	30.67 ²³	21.1 ¹⁴
30.6	25.93 ²⁰	39.7 ¹⁴	51.90 ²⁷	18.7 ²⁸	6.53 ²⁴	36.1 ⁶	30.87 ²⁰	22.8 ¹⁷
May 10.5	26.10 ¹⁷	41.3 ¹⁶	52.10 ²⁰	21.8 ³¹	6.74 ²¹	36.7 ⁶	31.04 ¹⁷	24.7 ¹⁹
20.5	26.24 ¹⁴	43.0 ¹⁷	52.22 ¹²	25.0 ³²	6.92 ¹⁸	37.2 ⁵	31.18 ¹⁴	26.8 ²¹
30.5	26.35 ¹¹	44.8 ¹⁸	52.27 ⁵	28.2 ³²	7.07 ¹⁵	37.7 ⁵	31.29 ¹¹	29.0 ²²
June 9.5	26.42 ⁷	46.6 ¹⁸	52.24 ³	31.3 ³¹	7.18 ¹¹	38.1 ⁴	31.36 ⁷	31.2 ²²
19.4	26.46 ⁴	48.4 ¹⁸	52.14 ¹⁰	34.3 ³⁰	7.25 ⁷	38.5 ⁴	31.39 ³	33.3 ²¹
29.4	26.46 ⁰	50.0 ¹⁶	51.97 ¹⁷	37.1 ²⁸	7.28 ³	38.8 ³	31.39 ⁰	35.3 ²⁰
July 9.4	26.43 ³	51.5 ¹⁵	51.73 ²⁴	39.5 ²⁴	7.28 ⁰	39.1 ³	31.35 ⁴	37.1 ¹⁸
19.4	26.37 ⁶	52.8 ¹³	51.43 ³⁰	41.6 ²¹	7.24 ⁴	39.3 ²	31.28 ⁷	38.6 ¹⁵
29.3	26.28 ⁹	53.9 ¹¹	51.09 ³⁴	43.2 ¹⁶	7.16 ⁸	39.4 ¹	31.18 ¹⁰	39.9 ¹³
Aug. 8.3	26.16 ¹²	54.8 ⁹	50.70 ³⁹	44.3 ¹¹	7.05 ¹¹	39.4 ¹	31.05 ¹³	40.9 ¹⁰
18.3	26.02 ¹⁴	55.4 ⁶	50.28 ⁴²	45.0 ⁷	6.91 ¹⁴	39.5 ⁰	30.89 ¹⁶	41.6 ⁷
28.2	25.86 ¹⁶	55.7 ³	49.84 ⁴⁴	45.2 ²	6.75 ¹⁶	39.5 ²	30.72 ¹⁷	42.0 ⁴
Sept. 7.2	25.69 ¹⁷	55.8 ¹	49.38 ⁴⁶	44.8 ⁴	6.59 ¹⁶	39.3 ³	30.54 ¹⁸	42.0 ⁰
17.2	25.52 ¹⁷	55.6 ²	48.93 ⁴⁵	43.9 ⁹	6.42 ¹⁷	39.0 ⁴	30.36 ¹⁸	42.0 ³
27.2	25.36 ¹⁶	55.1 ⁵	48.50 ⁴³	42.5 ¹⁴	6.26 ¹⁶	38.6 ⁴	30.36 ¹⁸	41.7 ⁶
Oct. 7.1	25.22 ¹⁴	55.1 ⁸	48.50 ⁴³	42.5 ¹⁴	6.26 ¹⁶	38.2 ⁴	30.18 ¹⁸	41.1 ¹⁰
17.1	25.22 ¹⁴	54.3 ¹¹	48.10 ⁴⁰	40.6 ¹⁹	6.12 ¹⁴	37.7 ⁵	30.02 ¹⁶	40.1 ¹⁰
27.1	25.11 ¹¹	53.2 ¹⁴	47.75 ³⁵	38.3 ²³	6.02 ¹⁰	37.2 ⁵	29.89 ¹³	38.8 ¹³
Nov. 6.1	25.03 ⁸	51.8 ¹⁴	47.45 ³⁰	35.5 ²⁸	5.95 ⁷	36.7 ⁵	29.80 ⁹	37.1 ¹⁷
16.0	24.99 ⁴	50.1 ¹⁷	47.22 ²³	32.3 ³²	5.93 ²	36.2 ⁵	29.75 ⁵	35.1 ²⁰
26.0	25.00 ¹	48.2 ¹⁹	47.08 ¹⁴	28.9 ³⁴	5.96 ³	35.8 ⁴	29.74 ¹	32.9 ²²
Dec. 6.0	25.06 ⁶	46.1 ²¹	47.03 ⁵	25.3 ³⁶	6.05 ⁹	35.5 ³	29.78 ⁴	30.4 ²⁵
15.9	25.17 ¹¹	43.8 ²³	47.06 ³	21.6 ³⁷	6.20 ¹⁵	35.5 ¹	29.88 ¹⁰	27.8 ²⁶
25.9	25.33 ¹⁶	41.4 ²⁴	47.19 ¹³	17.8 ³⁸	6.40 ²⁰	35.4 ¹	30.03 ¹⁵	25.1 ²¹
35.9	25.53 ²⁰	38.9 ²⁵	47.41 ²²	14.1 ³⁷	6.64 ²⁴	35.5 ²	30.22 ¹⁹	22.3 ²¹
	25.77 ²⁴	36.5 ²⁴	47.71 ³⁰	10.6 ³⁵	6.92 ²⁸	36.1 ⁴	30.46 ²⁴	19.5 ²¹
Sec δ , Tan δ	1.032	+0.254	2.110	+1.858	1.115	-0.493	1.076	+0.397
Mean Place	23 ^s .798	58 ^{''} .43	48 ^s .659	39 ^{''} .21	4 ^s .226	23 ^{''} .10	28 ^s .722	42 ^{''} .39
D' ψ α , D ω α	-0.01	+0.01	-0.04	+0.05	+0.01	-0.01	-0.01	+0.01
D ψ δ , D ω δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	λ Ophiuchi. Mag. 3.8		A Draconis. Mag. 5.0		τ Scorpii. Mag. 2.9		σ Herculis. Mag. 4.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 16 26 s	° ' " + 2 10 "	h m 16 28 s	° ' " +68 56 "	h m 16 30 s	° ' " -28 2 "	h m 16 31 s	° ' " +42 36 "
Jan. 0.9	30.22	15.6	6.24	64.6	26.28	14.9	16.44	40.9
10.9	30.48 26	13.7 19	6.64 40	61.3 33	26.58 30	15.3 4	16.71 27	37.8 31
20.9	30.77 29	11.9 18	7.13 49	58.4 29	26.91 33	15.8 5	17.02 31	34.9 29
30.8	31.08 31	10.2 17	7.70 57	56.0 24	27.26 35	16.5 7	17.36 34	32.4 25
Feb. 9.8	31.39 31	8.7 15	8.32 62	54.2 18	27.62 36	17.3 8	17.72 36	30.5 19
	31	12	65	12	36	8	37	13
19.8	31.70	7.5	8.97	53.0	27.98	18.1	18.09	29.2
Mar. 1.7	32.01 31	6.6 9	9.63 66	52.5 5	28.33 35	18.9 8	18.46 37	28.4 8
11.7	32.31 30	6.0 6	10.28 65	52.7 2	28.68 35	19.8 9	18.83 37	28.3 1
21.7	32.60 29	5.8 2	10.90 62	53.6 9	29.02 34	20.6 8	19.18 35	28.8 5
31.7	32.87 27	5.9 1	11.47 57	55.1 15	29.34 32	21.4 8	19.50 32	29.9 11
	25	3	50	20	29	7	29	16
Apr. 10.6	33.12	6.2	11.97	57.1	29.63	22.1	19.79	31.5
20.6	33.35 23	6.8 6	12.39 42	59.6 25	29.90 27	22.8 7	20.05 26	33.6 21
30.6	33.56 21	7.7 9	12.72 33	62.4 28	30.15 25	23.4 6	20.27 22	36.0 24
May 10.6	33.74 18	8.7 10	12.96 24	65.5 31	30.37 22	24.0 6	20.45 18	38.7 27
20.5	33.89 15	9.8 11	13.10 14	68.7 32	30.56 19	24.6 6	20.59 14	41.5 28
	13	12	4	33	16	6	9	29
30.5	34.02	11.0	13.14	72.0	30.72	25.2	20.68	44.4
June 9.5	34.11 9	12.2 12	13.07 7	75.2 32	30.84 12	25.7 5	20.73 5	47.3 29
	6	12	17	30	8	5	0	28
19.4	34.17	13.4 12	12.90 17	78.2 30	30.92 8	26.2 5	20.73 0	50.1 26
29.4	34.19 2	14.5 11	12.64 26	81.0 28	30.96 4	26.6 4	20.68 5	52.7 26
July 9.4	34.18 1	15.6 11	12.30 34	83.5 25	30.96 0	27.0 4	20.59 9	55.0 23
	5	9	42	21	4	3	13	20
19.4	34.13	16.5 8	11.88	85.6	30.92	27.3	20.46	57.0
29.3	34.05 8	17.3 8	11.39 49	87.2 16	30.84 8	27.5 2	20.29 17	58.7 17
Aug. 8.3	33.95 10	18.0 7	10.84 55	88.4 12	30.73 11	27.6 1	20.08 21	60.0 13
18.3	33.82 13	18.5 5	10.25 59	89.1 7	30.59 14	27.7 1	19.85 23	60.8 8
28.3	33.67 15	18.8 3	9.63 62	89.3 2	30.43 16	27.6 1	19.60 25	61.2 4
	15	2	63	4	17	2	26	1
Sept. 7.2	33.52	19.0	9.00	88.9	30.26	27.4	19.34	61.1
17.2	33.36 16	19.0 0	8.38 62	88.0 9	30.09 17	27.0 4	19.08 26	60.6 5
27.2	33.21 15	18.8 2	7.78 60	86.6 14	29.93 16	26.5 5	18.83 25	59.6 10
Oct. 7.1	33.08 13	18.4 4	7.22 56	84.7 19	29.79 14	26.0 5	18.60 23	58.1 15
17.1	32.98 10	17.8 6	6.71 51	82.4 23	29.68 11	25.4 6	18.40 20	56.2 19
	7	8	44	28	8	6	16	23
27.1	32.91	17.0	6.27	79.6	29.60	24.8	18.24	53.9
Nov. 6.1	32.88 3	15.9 11	5.93 34	76.5 31	29.57 3	24.2 6	18.13 11	51.2 27
16.0	32.90 2	14.6 13	5.69 24	73.1 34	29.60 3	23.7 5	18.07 6	48.2 30
26.0	32.96 6	13.2 14	5.56 13	69.5 36	29.69 9	23.3 4	18.07 0	45.0 32
Dec. 6.0	33.07 11	11.6 16	5.55 1	65.7 38	29.83 14	23.1 2	18.13 6	41.6 34
	16	18	11	38	19	1	13	35
16.0	33.23	9.8	5.66	61.9	30.02	23.0	18.26	38.1
25.9	33.44 21	7.9 19	5.88 22	58.2 37	30.26 24	23.1 1	18.45 19	34.7 34
35.9	33.69 25	6.0 19	6.22 34	54.7 35	30.54 28	23.4 3	18.69 24	31.4 33
Sec δ, Tan δ	1.001	+0.038	2.784	+2.599	1.133	-0.533	1.359	+0.920
Mean Place	31°.459	25''.03	8°.844	82''.98	27°.824	11''.01	17°.882	56''.94
D' δ a, D∞ a	0.00	0.00	-0.06	+0.07	+0.01	-0.01	-0.02	+0.02
D' δ δ, D∞ δ	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9	-0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Ophiuchi. Mag. 2.7		24 Scorpii. Mag. 5.0		ζ Herculis. Mag. 3.0		α Triang. Aust. Mag. 1.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 16 32 s	° ' " -10 23 "	h m 16 36 s	° ' " -17 34 "	h m 16 37 s	° ' " +31 45 "	h m 16 39 s	° ' " -68 52 "
Jan. 0.9	20.66	37.1	30.94	34.3	59.04	20.9	22.47	8 5
10.9	20.93 27	38.4 13	31.22 28	35.2 9	59.29 25	18.0 29	23.08 61	6.9 16
20.9	21.23 30	39.7 13	31.52 30	36.2 10	59.57 28	15.3 27	23.76 68	5.7 12
30.8	21.54 31	41.0 13	31.84 32	37.2 10	59.88 31	13.0 23	24.50 74	4.9 8
Feb. 9.8	21.86 32	42.2 12	32.17 33	38.2 10	60.21 33	11.1 19	25.28 78	4.5 4
19.8	22.18 32	43.2 10	32.51 34	39.1 9	60.54 33	9.7 14	26.08 80	4.5 0
Mar. 1.7	22.50 32	44.0 8	32.84 33	39.9 8	60.87 33	8.9 8	26.88 80	4.9 4
11.7	22.81 31	44.7 7	33.16 32	40.6 7	61.20 33	8.6 3	27.67 79	5.7 8
21.7	23.11 30	45.2 5	33.47 31	41.2 6	61.52 32	8.9 3	28.43 76	6.9 12
31.7	23.40 29	45.5 3	33.77 30	41.7 5	61.81 29	9.7 8	29.16 73	8.4 15
Apr. 10.6	23.67 27	45.6 1	34.05 28	42.0 3	62.08 27	11.0 13	29.84 68	10.2 18
20.6	23.91 24	45.5 1	34.31 26	42.2 2	62.33 25	12.8 18	30.46 62	12.2 20
30.6	24.13 22	45.3 2	34.54 23	42.3 1	62.55 22	14.9 21	31.02 56	14.4 22
May 10.6	24.33 20	44.9 4	34.75 21	42.3 0	62.73 18	17.3 24	31.50 48	16.8 24
20.5	24.50 17	44.5 4	34.93 18	42.3 0	62.88 15	19.8 25	31.90 40	19.4 26
30.5	24.64 14	44.0 5	35.08 15	42.2 1	62.99 11	22.4 26	32.21 31	22.0 26
June 9.5	24.74 10	43.5 5	35.20 12	42.1 1	63.06 7	25.0 26	32.42 21	24.6 26
19.4	24.81 7	42.9 6	35.28 8	41.9 2	63.09 3	27.5 25	32.53 11	27.2 26
29.4	24.85 4	42.4 5	35.32 4	41.8 1	63.07 2	29.9 24	32.54 1	29.7 25
July 9.4	24.85 0	41.9 5	35.33 1	41.6 2	63.02 5	32.0 21	32.45 9	32.0 23
19.4	24.81 4	41.4 5	35.30 3	41.5 1	62.93 9	33.9 19	32.26 19	34.0 20
29.3	24.74 7	41.0 4	35.23 7	41.4 1	62.81 12	35.5 16	32.26 27	34.0 17
Aug. 8.3	24.64 10	40.7 3	35.13 10	41.2 2	62.65 16	36.7 12	31.99 35	35.7 14
18.3	24.52 12	40.4 3	35.00 13	41.0 2	62.47 18	37.6 9	31.64 42	37.1 9
28.3	24.38 14	40.1 3	34.86 14	40.8 2	62.27 20	38.1 5	31.22 46	38.0 9
Sept. 7.2	24.23 15	39.9 2	34.71 15	40.6 2	62.06 21	38.1 1	30.76 49	38.5 0
17.2	24.07 16	39.9 2	34.55 16	40.6 3	61.84 22	38.2 3	30.27 49	38.5 5
27.2	23.92 15	39.7 1	34.39 16	40.3 3	61.63 21	37.9 7	29.78 49	38.0 9
Oct. 7.1	23.79 13	39.6 0	34.25 14	40.1 2	61.44 19	37.2 12	29.31 47	37.1 9
17.1	23.69 10	39.6 1	34.14 11	39.9 2	61.28 16	36.0 16	28.89 42	35.7 14
27.1	23.62 7	39.7 2	34.07 7	39.7 1	61.15 13	34.4 19	28.53 26	33.9 21
Nov. 6.1	23.59 3	39.9 4	34.07 3	39.6 0	61.15 9	32.5 23	28.27 16	31.8 23
16.0	23.59 2	40.3 5	34.04 2	39.6 1	61.06 4	30.2 26	28.11 4	29.5 25
26.0	23.61 7	40.8 7	34.06 7	39.7 3	61.02 2	27.6 28	28.07 9	27.0 26
Dec. 6.0	23.68 12	41.5 9	34.13 12	40.0 4	61.04 7	24.8 30	28.16 21	24.4 25
16.0	23.80 17	42.4 10	34.25 17	40.4 5	61.11 13	21.8 31	28.37 34	21.9 24
25.9	23.97 21	43.4 11	34.42 22	40.9 7	61.24 18	18.7 31	28.71 46	19.5 22
35.9	24.18 25	44.5 13	34.64 26	41.6 8	61.42 22	15.6 31	29.17 55	17.3 18
35.9	24.43 25	45.8 13	34.90 26	42.4 8	61.64 22	12.5 31	29.72 55	15.5 18
Sec δ, Tan δ	1.017	-0.183	1.049	-0.317	1.176	+0.619	2.774	-2.588
Mean Place	21 ^h .991	29 ^m .88	32 ^h .353	28 ^m .27	60 ^h .373	35 ^m .38	26 ^h .462	9 ^m .73
D'ψ α, D _α α	0.00	0.00	+0.01	-0.01	-0.02	+0.01	+0.06	-0.06
D'δ, D _δ δ	-0.1	-0.9	-0.1	-0.9	-0.1	-0.9	-0.1	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Herculis. Mag. 3.6		Groombridge 2377. Mag 4.9		ε Scorpil. Mag. 2.4		49 Herculis. Mag. 6.4	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 16 39 s	° ' " +39 4 "	h m 16 43 s	° ' " +56 55 "	h m 16 44 s	° ' " -34 8 "	h m 16 48 s	° ' " +15 6 "
Jan. 0.9	53.33 26	58.2 31	36.86 29	56.6 34	29.81 31	14.3 0	5.87 24	58.0 24
10.9	53.59 29	55.1 28	37.15 35	53.2 31	30.12 34	14.3 2	6.11 27	55.6 22
20.9	53.88 32	52.3 25	37.50 40	50.1 26	30.46 36	14.5 3	6.38 29	53.4 20
30.8	54.20 34	49.8 20	37.90 43	47.5 20	30.82 37	14.8 5	6.67 30	51.4 17
Feb. 9.8	54.54 35	47.8 14	38.33 45	45.5 14	31.19 38	15.3 6	6.97 31	49.7 14
19.8	54.89 36	46.4 8	38.78 47	44.1 8	31.57 38	15.9 7	7.28 31	48.3 9
Mar. 1.8	55.25 35	45.6 3	39.25 46	43.3 1	31.95 37	16.6 7	7.59 31	47.4 5
11.7	55.60 34	45.3 4	39.71 44	43.2 6	32.32 36	17.3 8	7.90 30	46.9 0
21.7	55.94 32	45.7 10	40.15 41	43.8 12	32.68 34	18.1 8	8.20 28	46.9 4
31.7	56.26 29	46.7 15	40.56 38	45.0 18	33.02 32	18.9 8	8.48 26	47.3 8
Apr. 10.6	56.55 26	48.2 19	40.94 33	46.8 23	33.34 30	19.7 9	8.74 24	48.1 12
20.6	56.81 23	50.1 23	41.27 28	49.1 27	33.64 28	20.6 9	8.98 22	49.3 14
30.6	57.04 19	52.4 26	41.55 22	51.8 29	33.92 25	21.5 8	9.20 20	50.7 17
May 10.6	57.23 15	55.0 27	41.77 16	54.7 31	34.17 21	22.3 8	9.40 16	52.4 19
20.5	57.38 10	57.7 28	41.93 9	57.8 32	34.38 17	23.1 9	9.56 13	54.3 19
30.5	57.48 6	60.5 28	42.02 3	61.0 32	34.55 14	24.0 8	9.69 10	56.2 19
June 9.5	57.54 2	63.3 28	42.05 4	64.2 31	34.69 10	24.8 8	9.79 6	58.1 19
19.5	57.56 3	66.1 26	42.01 10	67.3 29	34.79 6	25.6 8	9.85 3	60.0 18
29.4	57.53 7	68.7 23	41.91 16	70.2 26	34.85 1	26.4 7	9.88 1	61.8 17
July 9.4	57.46 11	71.0 21	41.75 22	72.8 23	34.86 3	27.1 7	9.87 5	63.5 15
19.4	57.35 15	73.1 17	41.53 27	75.1 19	34.83 8	27.8 5	9.82 8	65.0 13
29.3	57.20 18	74.8 13	41.26 31	77.0 14	34.75 12	28.3 4	9.74 11	66.3 10
Aug. 8.3	57.02 21	76.1 9	40.95 35	78.4 10	34.63 15	28.7 2	9.63 13	67.3 8
18.3	56.81 23	77.0 5	40.60 37	79.4 5	34.48 17	28.9 0	9.50 16	68.1 5
28.3	56.58 24	77.5 0	40.23 38	79.9 0	34.31 18	28.9 1	9.34 17	68.6 2
Sept. 7.2	56.34 25	77.5 4	39.85 39	79.9 6	34.13 19	28.8 3	9.17 18	68.8 1
17.2	56.09 24	77.1 9	39.46 38	79.3 11	33.94 18	28.5 5	8.99 17	68.7 4
27.2	55.85 22	76.2 13	39.08 36	78.2 15	33.76 16	28.0 7	8.82 16	68.3 7
Oct. 7.2	55.63 19	74.9 17	38.72 32	76.7 20	33.60 13	27.3 7	8.66 13	67.6 10
17.1	55.44 15	73.2 21	38.40 27	74.7 25	33.47 10	26.6 8	8.53 10	66.6 13
27.1	55.29 11	71.1 25	38.13 21	72.2 29	33.37 5	25.8 9	8.43 6	65.3 15
Nov. 6.1	55.18 6	68.6 28	37.92 15	69.3 32	33.32 1	24.9 8	8.37 1	63.8 18
16.0	55.12 0	65.8 31	37.77 7	66.1 34	33.33 7	24.1 7	8.36 3	62.0 21
26.0	55.12 6	62.7 33	37.70 1	62.7 36	33.40 13	23.4 7	8.39 8	59.9 23
Dec. 6.0	55.18 12	59.4 34	37.71 9	59.1 37	33.53 19	22.7 5	8.47 13	57.6 24
16.0	55.30 17	56.0 33	37.80 17	55.4 37	33.72 24	22.2 3	8.60 17	55.2 25
25.9	55.47 23	52.7 33	37.97 25	51.7 36	33.96 28	21.9 2	8.77 22	52.7 24
35.9	55.70	49.4 33	38.22	48.1 36	34.24	21.7	8.99	50.3
Sec δ, Tan δ	1.288	+0.812	1.833	+1.536	1.208	-0.678	1.036	+0.270
Mean Place	54°.761	73''.57	38°.797	73''.47	31°.509	10''.77	7°.162	69''.85
D'φ α, D _α α	-0.02	+0.02	-0.04	+0.03	+0.02	-0.01	-0.01	+0.01
D'δ, D _δ δ	-0.1	-0.9	-0.1	-0.9	-0.1	-0.9	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε ¹ Aræ. Mag. 4.2		κ Ophiuchi. Mag. 3.4		30 Ophiuchi. Mag. 5.0		ε Herculis. Mag. 3.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 16 52 s	° ' -53 1 "	h m 16 53 s	° ' + 9 30 "	h m 16 56 s	° ' - 4 5 "	h m 16 56 s	° ' +31 2 "
Jan. 0.9	36.26	42.3	31.66	23.4	27.00	43.2	56.21	60.2
10.9	36.65 39	41.3 10	31.89 23	21.3 21	27.25 25	44.8 16	56.44 23	57.2 30
20.9	37.08 43	40.5 8	32.15 26	19.2 21	27.52 27	46.3 15	56.71 27	54.4 28
30.8	37.55 47	40.0 5	32.44 29	17.3 19	27.81 29	47.7 14	57.01 30	52.0 24
Feb. 9.8	38.04 49	39.8 2	32.74 30	15.7 16	28.11 30	48.9 12	57.32 31	50.0 20
	50	1	31	13	31	10	32	15
19.8	38.54	39.9	33.05	14.4	28.42	49.9	57.64	48.5
Mar. 1.8	39.04 50	40.3 4	33.36 31	13.5 9	28.74 32	50.7 8	57.97 33	47.6 9
	50	6	30	5	31	6	33	4
11.7	39.54 50	40.9 6	33.66 30	13.0 5	29.05 31	51.3 6	58.30 33	47.2 4
21.7	40.03 49	41.8 9	33.95 29	12.9 1	29.35 30	51.6 3	58.62 32	47.3 1
31.7	40.50 47	42.9 11	34.23 28	13.2 3	29.63 28	51.6 0	58.93 31	48.0 7
	44	12	27	7	27	2	29	12
Apr. 10.7	40.94	44.1	34.50	13.9	29.90	51.4	59.22	49.2
20.6	41.35 41	45.5 14	34.75 25	14.8 9	30.16 26	51.0 4	59.48 26	50.9 17
30.6	41.72 37	47.1 16	34.98 23	16.0 12	30.40 24	50.4 6	59.71 23	52.9 20
May 10.6	42.05 33	48.8 17	35.18 20	17.4 14	30.61 21	49.6 8	59.91 20	55.2 23
20.5	42.34 29	50.6 18	35.35 17	19.0 16	30.79 18	48.7 9	60.08 17	57.7 25
	24	18	14	17	16	9	13	26
30.5	42.58	52.4	35.49	20.7	30.95	47.8	60.21	60.3
June 9.5	42.76 18	54.3 19	35.60 11	22.4 17	31.07 12	46.8 10	60.30 9	62.9 26
19.5	42.89 13	56.1 18	35.67 7	24.0 16	31.16 9	45.8 10	60.35 5	65.5 26
29.4	42.95 6	57.9 18	35.70 3	25.6 16	31.21 5	44.9 9	60.36 1	68.0 25
July 9.4	42.95 0	59.5 16	35.70 0	27.1 15	31.23 2	44.1 8	60.33 3	70.2 22
	6	15	3	13	2	7	8	20
19.4	42.89	61.0	35.67	28.4	31.21	43.4	60.25	72.2
29.4	42.77 12	62.3 13	35.60 7	29.5 11	31.15 6	42.7 7	60.14 11	73.9 17
Aug. 8.3	42.60 17	63.3 10	35.50 10	30.5 10	31.06 9	42.1 6	60.00 14	75.3 14
	21	7	13	7	12	5	17	11
18.3	42.39 21	64.0 7	35.37 13	31.2 7	30.94 12	41.6 5	59.83 17	76.4 11
28.3	42.15 24	64.4 4	35.22 15	31.7 5	30.80 14	41.3 3	59.63 20	77.1 7
	27	1	16	2	15	2	21	3
Sept. 7.2	41.88	64.5	35.06	31.9	30.65	41.1	59.42	77.4
17.2	41.60 28	64.2 3	34.89 17	31.9 0	30.49 16	41.0 1	59.20 22	77.2 2
27.2	41.33 27	63.5 7	34.72 17	31.6 3	30.33 16	41.0 0	58.99 21	76.6 6
Oct. 7.2	41.09 24	62.5 10	34.57 15	31.1 5	30.19 14	41.2 2	58.79 20	75.6 10
17.1	40.89 20	61.2 13	34.44 13	30.3 8	30.07 12	41.5 3	58.62 17	74.2 14
	15	15	10	10	9	5	14	18
27.1	40.74	59.7	34.34	29.3	29.98	42.0	58.48	72.4
Nov. 6.1	40.65 9	58.0 17	34.28 6	28.0 13	29.93 5	42.7 7	58.38 10	70.3 21
16.1	40.64 1	56.2 18	34.27 1	26.5 15	29.93 0	43.5 8	58.32 6	67.9 24
26.0	40.70 6	54.4 18	34.30 3	24.7 18	29.97 4	44.5 10	58.32 0	65.2 27
Dec. 6.0	40.84 14	52.6 18	34.38 8	22.7 20	30.06 9	45.7 12	58.37 5	62.3 29
	22	17	13	21	14	13	11	31
16.0	41.06	50.9	34.51	20.6	30.20	47.0	58.48	59.2
25.9	41.35 29	49.4 15	34.68 17	18.4 22	30.38 18	48.4 14	58.64 16	56.1 3
35.9	41.71 36	48.2 12	34.90 22	16.3 21	30.61 23	49.9 15	58.84 20	53.0 3
Sec δ, Tan δ	1.663	-1.329	1.014	+0.167	1.003	-0.072	1.167	+0.602
Mean Place	38°.664	40'' .72	32°.962	34'' .34	28°.348	34'' .36	57°.627	73'' .97
D'ψ α, Dω α	+0.03	-0.03	0.00	0.00	0.00	0.00	-0.02	+0.01
Dψ δ, Dω δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Herculis. Mag. 5.3		η Ophiuchi. Mag. 2.6		η Scorpii. Mag. 3.4		ζ Draconis. Mag. 3.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 16 58 s	° ' +33 41 "	h m 17 5 s	° ' -15 37 "	h m 17 5 s	° ' -43 7 "	h m 17 8 s	° ' +65 48 "
Jan. 0.9	22.11	22.7	21.75	12.1	53.17	35.9	29.18	62.1
10.9	22.34 23	19.7 30	22.00 25	13.0 9	53.49 32	35.3 6	29.46 28	58.6 35
20.9	22.61 27	16.9 28	22.28 28	13.9 9	53.85 36	34.8 5	29.83 37	55.4 32
30.9	22.91 30	14.4 25	22.58 30	14.8 9	54.23 38	34.5 3	30.28 45	52.6 28
Feb. 9.8	23.23 32	12.3 21	22.90 32	15.6 8	54.64 41	34.5 0	30.79 51	50.4 22
	33	15	32	8	42	2	55	17
19.8	23.56	10.8	23.22	16.4	55.06	34.7	31.34	48.7
Mar. 1.8	23.90 34	9.9 9	23.55 33	17.1 7	55.48 42	35.0 3	31.92 58	47.7 10
11.7	24.23 33	9.5 4	23.87 32	17.6 5	55.90 42	35.5 5	32.50 58	47.4 3
21.7	24.56 33	9.7 2	24.19 32	18.0 4	56.31 41	36.1 6	33.07 57	47.8 4
31.7	24.87 31	10.4 7	24.50 31	18.3 3	56.71 40	36.9 8	33.62 55	48.8 10
	29	12	29	1	38	9	50	16
Apr. 10.7	25.16	11.6	24.79	18.4	57.09	37.8	34.12	50.4
20.6	25.43 27	13.3 17	25.06 27	18.3 1	57.45 36	38.8 10	34.56 44	52.6 22
30.6	25.67 24	15.4 21	25.31 25	18.1 2	57.78 33	39.9 11	34.94 38	55.2 26
May 10.6	25.87 20	17.8 24	25.54 23	17.9 2	58.08 30	41.0 11	35.25 31	58.1 29
20.6	26.04 17	20.4 26	25.75 21	17.6 3	58.34 26	42.2 12	35.47 22	61.2 31
	13	27	18	3	23	12	13	33
30.5	26.17	23.1	25.93	17.3	58.57	43.4	35.60	64.5
June 9.5	26.26 9	25.8 27	26.07 14	17.0 3	58.75 18	44.7 13	35.64 4	67.8 33
19.5	26.31 5	28.5 27	26.17 10	16.7 3	58.88 13	46.0 13	35.60 4	71.1 33
29.4	26.31 0	31.1 26	26.24 7	16.4 3	58.96 8	47.2 12	35.47 13	74.2 31
July 9.4	26.27 4	33.4 23	26.27 3	16.1 3	58.99 3	48.4 12	35.25 22	77.0 28
	8	21	1	3	2	11	30	26
19.4	26.19	35.5	26.26	15.8	58.97	49.5	34.95	79.6
29.4	26.07 12	37.3 18	26.21 5	15.6 2	58.90 7	50.5 10	34.58 37	81.8 22
Aug. 8.3	25.92 15	38.7 14	26.13 8	15.4 2	58.78 12	51.3 8	34.15 43	83.5 17
18.3	25.74 18	39.8 11	26.02 11	15.2 2	58.62 16	51.9 6	33.67 48	84.8 13
28.3	25.54 20	40.5 7	25.88 14	15.0 2	58.43 19	52.2 3	33.15 52	85.6 8
	22	3	16	1	21	1	54	3
Sept. 7.3	25.32	40.8	25.72	14.9	58.22	52.3	32.61	85.9
17.2	25.09 23	40.6 2	25.56 16	14.7 2	58.00 22	52.1 2	32.05 56	85.7 2
27.2	24.87 22	40.0 6	25.40 16	14.6 1	57.79 21	51.7 4	31.50 55	84.9 8
Oct. 7.2	24.66 21	39.0 10	25.25 15	14.5 1	57.59 20	51.0 7	30.97 53	83.6 13
17.1	24.48 18	37.5 15	25.13 12	14.4 1	57.42 17	50.1 9	30.48 49	81.8 18
	15	18	9	0	13	11	44	22
27.1	24.33	35.7	25.04	14.4	57.29	49.0	30.04	79.6
Nov. 6.1	24.22 11	33.5 22	24.98 6	14.5 1	57.21 8	47.8 12	29.67 37	76.9 27
16.1	24.16 6	30.9 26	24.97 1	14.7 2	57.19 2	46.5 13	29.39 28	73.9 30
26.0	24.15 1	28.1 28	25.01 4	15.0 3	57.24 5	45.2 13	29.20 19	70.5 34
Dec. 6.0	24.20 5	25.1 30	25.11 10	15.4 4	57.35 11	44.0 12	29.11 9	66.9 36
	10	31	14	6	18	11	1	37
16.0	24.30	22.0	25.25	16.0	57.53	42.9	29.12	63.2
26.0	24.45 15	18.8 32	25.43 18	16.7 7	57.77 24	41.9 10	29.24 12	59.5 37
35.9	24.65 20	15.7 31	25.66 23	17.5 8	58.06 29	41.0 9	29.46 22	55.9 36
Sec δ , Tan δ	1.202	+0.667	1.038	-0.280	1.370	-0.937	2.441	+2.227
Mean Place	23°.568	36''.79	23°.200	4''.72	55°.150	32''.22	31°.967	78''.04
D' α , D ₀ α	-0.02	+0.01	+0.01	0.00	+0.02	-0.01	-0.06	+0.03
D' δ , D ₀ δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Herculis. Var. 3.1-3.9		δ Herculis. Mag. 3.2		π Herculis. Mag. 3.4		59 Apodis (G.). Mag. 5.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 17 10 s	° ' +14 28 "	h m 17 11 s	° ' +24 56 "	h m 17 11 s	° ' +36 53 "	h m 17 15 s	° ' -80 46 "
Jan. 0.9	39.43	67.9	26.02	15.3	59.40	69.8	1.26	52.2
10.9	39.65 ²²	65.5 ²⁴	26.24 ²²	12.5 ²⁸	59.62 ²²	66.7 ³¹	2.35 ¹⁰⁹	49.8 ²⁴
20.9	39.90 ²⁵	63.3 ²²	26.49 ²⁵	9.9 ²⁶	59.88 ²⁶	63.8 ²⁹	3.63 ¹²⁸	47.7 ²¹
30.9	40.17 ²⁷	61.3 ²⁰	26.77 ²⁸	7.6 ²³	60.17 ²⁹	61.2 ²⁶	5.07 ¹⁴⁴	46.0 ¹⁷
Feb. 9.8	40.46 ²⁹	59.6 ¹⁷	27.07 ³⁰	5.7 ¹⁹	60.49 ³²	59.1 ²¹	6.64 ¹⁵⁷	44.8 ¹²
	31	14	31	15	33	16	166	8
19.8	40.77	58.2	27.38	4.2	60.82	57.5	8.30	44.0
Mar. 1.8	41.08 ³¹	57.3 ⁹	27.70 ³²	3.2 ¹⁰	61.16 ³⁴	56.4 ¹¹	10.00 ¹⁷⁰	43.7 ³
11.7	41.38 ³⁰	56.8 ⁵	28.01 ³¹	2.7 ⁵	61.50 ³⁴	55.9 ⁵	11.72 ¹⁷²	43.9 ²
21.7	41.68 ³⁰	56.7 ¹	28.32 ³¹	2.7 ⁰	61.84 ³⁴	56.0 ¹	13.42 ¹⁷⁰	44.5 ⁶
31.7	41.97 ²⁹	57.1 ⁴	28.62 ³⁰	3.2 ⁵	62.17 ³³	56.7 ⁷	15.07 ¹⁶⁵	45.5 ¹⁰
	28	8	29	10	31	13	157	14
Apr. 10.7	42.25	57.9	28.91	4.2	62.48	58.0	16.64	46.9
20.6	42.51 ²⁶	59.0 ¹¹	29.18 ²⁷	5.6 ¹⁴	62.76 ²⁸	59.7 ¹⁷	18.09 ¹⁴⁵	48.7 ¹⁸
30.6	42.75 ²⁴	60.4 ¹⁴	29.42 ²⁴	7.4 ¹⁸	63.01 ²⁵	61.8 ²¹	19.41 ¹³²	50.8 ²¹
May 10.6	42.96 ²¹	62.0 ¹⁶	29.63 ²¹	9.4 ²⁰	63.23 ²²	64.2 ²⁴	20.57 ¹¹⁶	53.2 ²⁴
20.6	43.14 ¹⁸	63.8 ¹⁸	29.81 ¹⁸	11.7 ²³	63.41 ¹⁸	66.9 ²⁷	21.55 ⁹⁸	55.9 ²⁷
	16	20	15	24	15	28	78	28
30.5	43.30	65.8	29.96	14.1	63.56	69.7	22.33	58.7
June 9.5	43.42 ¹²	67.8 ²⁰	30.07 ¹¹	16.6 ²⁵	63.66 ¹⁰	72.6 ²⁹	22.90 ⁵⁷	61.6 ²⁹
19.5	43.50 ⁸	69.7 ¹⁹	30.14 ⁷	19.0 ²⁴	63.72 ⁶	75.5 ²⁹	23.24 ³⁴	64.6 ³⁰
29.4	43.55 ⁵	71.6 ¹⁹	30.18 ⁴	21.3 ²³	63.73 ¹	78.2 ²⁷	23.34 ¹⁰	67.5 ²⁹
July 9.4	43.56 ¹	73.4 ¹⁸	30.17 ¹	23.4 ²¹	63.70 ³	80.7 ²⁵	23.20 ¹⁴	70.3 ²⁸
	3	16	5	19	8	22	36	26
19.4	43.53	75.0	30.12	25.3	63.62	82.9	22.84	72.9
29.4	43.46 ⁷	76.4 ¹⁴	30.04 ⁸	27.0 ¹⁷	63.50 ¹²	84.9 ²⁰	22.27 ⁵⁷	75.3 ²⁴
Aug. 8.3	43.36 ¹⁰	77.5 ¹¹	29.92 ¹²	28.4 ¹⁴	63.34 ¹⁶	86.5 ¹⁶	21.50 ⁷⁷	77.3 ²⁰
18.3	43.23 ¹³	78.4 ⁹	29.77 ¹⁵	29.5 ¹¹	63.15 ¹⁹	87.8 ¹³	20.56 ⁹⁴	78.8 ¹⁵
28.3	43.08 ¹⁵	79.0 ⁶	29.60 ¹⁷	30.3 ⁸	62.93 ²²	88.6 ⁸	19.49 ¹⁰⁷	79.9 ¹¹
	17	3	19	4	23	4	115	6
Sept. 7.3	42.91	79.3	29.41	30.7	62.70	89.0	18.34	80.5
17.2	42.73 ¹⁸	79.3 ⁰	29.21 ²⁰	30.7 ⁰	62.46 ²⁴	89.0 ⁰	17.15 ¹¹⁹	80.5 ⁰
27.2	42.56 ¹⁷	79.1 ²	29.01 ²⁰	30.3 ⁴	62.22 ²⁴	88.5 ⁵	15.97 ¹¹⁸	80.0 ⁵
Oct. 7.2	42.40 ¹⁶	78.6 ⁵	28.82 ¹⁹	29.5 ⁸	61.99 ²³	87.6 ⁹	14.85 ¹¹²	78.9 ¹¹
17.1	42.25 ¹⁵	77.8 ⁸	28.66 ¹⁶	28.4 ¹¹	61.79 ²⁰	86.2 ¹⁴	13.84 ¹⁰¹	77.3 ¹⁶
	12	12	14	15	17	18	84	21
27.1	42.13	76.6	28.52	26.9	61.62	84.4	13.00	75.2
Nov. 6.1	42.05 ⁸	75.1 ¹⁵	28.42 ¹⁰	25.1 ¹⁸	61.49 ¹³	82.2 ²²	12.37 ⁶³	72.7 ²⁵
16.1	42.02 ³	73.4 ¹⁷	28.37 ⁵	22.9 ²²	61.40 ⁹	79.7 ²⁵	11.98 ³⁹	69.9 ²⁸
26.0	42.03 ¹	71.5 ¹⁹	28.36 ¹	20.5 ²⁴	61.37 ³	76.9 ²⁸	11.85 ¹³	67.0 ²⁹
Dec. 6.0	42.09 ⁶	69.4 ²¹	28.40 ⁴	17.9 ²⁶	61.39 ²	73.8 ³¹	12.00 ¹⁵	64.0 ³⁰
	11	23	10	28	8	32	43	30
16.0	42.20	67.1	28.50	15.1	61.47	70.6	12.43	61.0
26.0	42.35 ¹⁵	64.7 ²⁴	28.65 ¹⁵	12.3 ²⁸	61.61 ¹⁴	67.3 ³³	13.12 ⁶⁹	58.1 ²⁹
35.9	42.55 ²⁰	62.4 ²³	28.84 ¹⁹	9.5 ²⁸	61.80 ¹⁹	64.1 ³²	14.06 ⁹⁴	55.5 ²⁶
Sec δ , Tan δ	1.033	+0.258	1.103	+0.465	1.251	+0.751	6.244	-6.163
Mean Place	40 ^h .792	79 ^m .44	27 ^h .443	28 ^m .07	60 ^h .962	83 ^m .79	10 ^h .247	50 ^m .95
D' ψ α , D ω α	-0.01	0.00	-0.01	+0.01	-0.02	+0.01	+0.16	-0.08
D ψ δ , D ω δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>θ</i> Ophiuchi. Mag. 3.4		<i>ω</i> Herculis. Mag. 5.4		<i>β</i> Aræ. Mag. 2.8		<i>δ</i> Ophiuchi. Mag. 4.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 17 16 s	° ' -24 54 "	h m 17 17 s	° ' +32 34 "	h m 17 18 s	° ' -55 26 "	h m 17 21 s	° ' -24 5 "
Jan. 0.9	38.32	55.5	22.67	30.9	1.33	58.4	1.74	53.5
10.9	38.57 25	55.8 3	22.88 21	27.8 31	1.71 38	57.0 14	1.98 24	53.8 3
20.9	38.86 29	56.2 4	23.13 25	25.0 28	2.13 42	55.9 11	2.26 28	54.2 4
30.9	39.17 31	56.6 4	23.41 28	22.5 25	2.59 46	55.0 9	2.57 31	54.6 4
Feb. 9.8	39.50 33	57.1 5	23.72 31	20.4 21	3.09 50	54.4 6	2.90 33	55.1 5
	34	5	32	17	52	3	34	5
19.8	39.84	57.6	24.04	18.7	3.61	54.1	3.24	55.6
Mar. 1.8	40.19 35	58.1 5	24.37 33	17.6 11	4.14 53	54.1 0	3.58 34	56.0 4
11.8	40.53 34	58.5 4	24.70 33	17.0 6	4.67 53	54.4 3	3.92 34	56.4 4
21.7	40.87 34	58.9 4	25.03 33	17.0 0	5.19 52	54.9 5	4.26 34	56.7 3
31.7	41.20 33	59.2 3	25.35 32	17.6 6	5.69 50	55.6 7	4.59 33	57.0 3
	32	3	30	11	49	10	31	2
Apr. 10.7	41.52	59.5	25.65	18.7	6.18	56.6	4.90	57.2
20.6	41.82 30	59.7 2	25.93 28	20.3 16	6.64 46	57.8 12	5.20 30	57.4 2
30.6	42.10 28	59.9 2	26.18 25	22.3 20	7.07 43	59.2 14	5.48 28	57.6 2
May 10.6	42.35 25	60.1 2	26.40 22	24.6 23	7.45 38	60.8 16	5.74 26	57.7 1
20.6	42.58 23	60.2 1	26.59 19	27.1 25	7.79 34	62.5 17	5.97 23	57.8 1
	20	2	15	26	29	18	20	1
30.5	42.78	60.4	26.74	29.7	8.08	64.3	6.17	57.9
June 9.5	42.94 16	60.6 2	26.85 11	32.4 27	8.31 23	66.2 19	6.34 17	58.0 1
19.5	43.07 13	60.8 2	26.92 7	35.1 27	8.48 17	68.1 19	6.47 13	58.1 1
29.5	43.15 8	61.0 2	26.95 3	37.7 26	8.58 10	70.0 19	6.56 9	58.3 2
July 9.4	43.19 4	61.2 2	26.93 2	40.1 24	8.62 4	71.8 18	6.60 4	58.5 2
	0	2	6	22	3	17	0	1
19.4	43.19	61.4	26.87	42.3	8.59	73.5	6.60	58.6
29.4	43.15 4	61.6 2	26.77 10	44.2 19	8.49 10	75.0 15	6.56 4	58.8 2
Aug. 8.3	43.07 8	61.8 2	26.63 14	45.8 16	8.33 16	76.2 12	6.49 7	59.0 2
18.3	42.95 12	61.9 1	26.46 17	47.0 12	8.12 21	77.2 10	6.38 11	59.1 1
28.3	42.81 14	61.9 0	26.27 19	47.8 8	7.87 25	77.9 7	6.24 14	59.1 0
	16	0	21	4	28	3	16	0
Sept. 7.3	42.65	61.9	26.06	48.2	7.59	78.2	6.08	59.1
17.2	42.48 17	61.8 1	25.83 23	48.2 0	7.29 30	78.2 0	5.91 17	59.0 1
27.2	42.31 17	61.6 2	25.61 22	47.8 4	6.99 30	77.8 4	5.74 17	58.8 2
Oct. 7.2	42.15 16	61.3 3	25.40 21	47.0 8	6.72 27	77.0 8	5.58 16	58.6 2
17.1	42.01 14	61.0 3	25.21 19	45.7 13	6.48 24	75.9 11	5.44 14	58.3 3
	11	4	16	17	19	14	11	3
27.1	41.90	60.6	25.05	44.0	6.29	74.5	5.33	58.0
Nov. 6.1	41.83 7	60.3 3	24.92 13	42.0 20	6.16 13	72.8 17	5.26 7	57.7 3
16.1	41.81 2	60.0 3	24.84 8	39.6 24	6.10 6	70.9 19	5.24 2	57.4 3
26.0	41.85 4	59.8 2	24.82 2	36.9 27	6.12 2	69.0 19	5.27 3	57.2 2
Dec. 6.0	41.94 9	59.6 2	24.85 3	34.0 29	6.22 10	67.1 19	5.35 8	57.1 1
	14	1	8	31	19	19	13	0
16.0	42.08	59.5	24.93	30.9	6.41	65.2	5.48	57.1
26.0	42.27 19	59.6 1	25.06 13	27.8 31	6.67 26	63.4 18	5.66 18	57.2 1
35.9	42.50 23	59.8 2	25.24 18	24.7 31	7.01 34	61.8 16	5.89 23	57.4 2
Sec δ , Tan δ	1.102	-0.465	1.187	+0.639	1.764	-1.452	1.096	-0.447
Mean Place	39°.893	48''.96	24°.194	44''.26	3°.901	55''.15	3°.304	46''.61
D' α , D. α	+0.01	-0.01	-0.02	+0.01	+0.04	-0.02	+0.01	-0.01
D' δ , D. δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Scorpii. Mag. 1.7		β Draconis. Mag. 3.0		α Ophiuchi. Mag. 2.1		ξ Serpentis. Mag. 3.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 17 27 s	° ' -37 2 "	h m 17 28 s	° ' +52 21 "	h m 17 30 s	° ' +12 36 "	h m 17 32 s	° ' -15 20 "
Jan. 0.9	40.13	34.1	25.91	41.2	52.31	70.1	34.72	48.5
10.9	40.40 ²⁷	33.6 ⁵	26.11 ²⁰	37.7 ³⁵	52.51 ²⁰	67.9 ²²	34.95 ²³	49.2 ⁷
20.9	40.71 ³¹	33.2 ⁴	26.38 ²⁷	34.5 ³²	52.75 ²⁴	65.7 ²²	35.21 ²⁶	50.0 ⁸
30.9	41.05 ³⁴	33.0 ²	26.70 ³²	31.6 ²⁹	53.01 ²⁶	63.7 ²⁰	35.49 ²⁸	50.8 ⁸
Feb. 9.8	41.42 ³⁷	32.9 ¹	27.06 ³⁶	29.2 ²⁴	53.29 ²⁸	62.0 ¹⁷	35.79 ³⁰	51.5 ⁷
	38	1	39	18	30	13	31	6
19.8	41.80	33.0	27.45	27.4	53.59	60.7	36.10	52.1
Mar. 1.8	42.19 ³⁹	33.2 ²	27.86 ⁴¹	26.2 ¹²	53.89 ³⁰	59.8 ⁹	36.42 ³²	52.6 ⁵
11.8	42.58 ³⁹	33.5 ³	28.28 ⁴²	25.6 ⁶	54.19 ³⁰	59.2 ⁶	36.75 ³³	53.0 ⁴
21.7	42.96 ³⁸	33.8 ³	28.70 ⁴²	25.7 ¹	54.49 ³⁰	59.0 ²	37.07 ³²	53.2 ²
31.7	43.33 ³⁷	34.2 ⁴	29.10 ⁴⁰	26.4 ⁷	54.79 ³⁰	59.3 ³	37.38 ³¹	53.3 ¹
	36	5	38	13	29	7	30	0
Apr. 10.7	43.69	34.7	29.48	27.7	55.08	60.0	37.68	53.3
20.6	44.04 ³⁵	35.2 ⁵	29.83 ³⁵	29.6 ¹⁹	55.35 ²⁷	61.1 ¹¹	37.97 ²⁹	53.1 ²
30.6	44.36 ³²	35.8 ⁶	30.14 ³¹	31.9 ²³	55.60 ²⁵	62.4 ¹³	38.24 ²⁷	52.8 ³
May 10.6	44.66 ³⁰	36.5 ⁷	30.40 ²⁶	34.6 ²⁷	55.83 ²³	64.0 ¹⁶	38.49 ²⁵	52.4 ⁴
20.6	44.93 ²⁷	37.2 ⁷	30.62 ²²	37.6 ³⁰	56.03 ²⁰	65.8 ¹⁸	38.72 ²³	52.0 ⁴
	24	8	17	32	17	19	20	5
30.5	45.17	38.0	30.79	40.8	56.20	67.7	38.92	51.5
June 9.5	45.36 ¹⁹	38.8 ⁸	30.90 ¹¹	44.0 ³²	56.34 ¹⁴	69.6 ¹⁹	39.09 ¹⁷	51.1 ⁴
19.5	45.51 ¹⁵	39.7 ⁹	30.94 ⁴	47.2 ³²	56.44 ¹⁰	71.5 ¹⁹	39.22 ¹³	50.7 ⁴
29.5	45.61 ¹⁰	40.6 ⁹	30.92 ²	50.3 ³¹	56.51 ⁷	73.4 ¹⁹	39.32 ¹⁰	50.3 ⁴
July 9.4	45.67 ⁶	41.5 ⁹	30.85 ⁷	53.2 ²⁹	56.54 ³	75.2 ¹⁸	39.37 ⁵	49.9 ⁴
	1	8	13	27	1	16	1	3
19.4	45.68	42.3	30.72	55.9	56.53	76.8	39.38	49.6
29.4	45.64 ⁴	43.0 ⁷	30.54 ¹⁸	58.3 ²⁴	56.48 ⁵	78.2 ¹⁴	39.35 ³	49.4 ²
Aug. 8.3	45.55 ⁹	43.7 ⁷	30.31 ²³	60.3 ²⁰	56.39 ⁹	79.4 ¹²	39.29 ⁶	49.2 ²
18.3	45.42 ¹³	44.2 ⁵	30.03 ²⁸	61.8 ¹⁵	56.27 ¹²	80.3 ⁹	39.19 ¹⁰	49.1 ¹
28.3	45.26 ¹⁶	44.6 ⁴	29.72 ³¹	62.9 ¹¹	56.13 ¹⁴	81.0 ⁷	39.06 ¹³	49.0 ¹
	18	2	33	6	16	4	15	1
Sept. 7.3	45.08	44.8	29.39	63.5	55.97	81.4	38.91	48.9
17.2	44.88 ²⁰	44.8 ⁰	29.04 ³⁵	63.6 ¹	55.80 ¹⁷	81.6 ²	38.75 ¹⁶	48.8 ¹
27.2	44.68 ²⁰	44.5 ³	28.69 ³⁵	63.2 ⁴	55.62 ¹⁸	81.5 ¹	38.58 ¹⁷	48.7 ¹
Oct. 7.2	44.49 ¹⁹	44.1 ⁴	28.35 ³⁴	62.3 ⁹	55.45 ¹⁷	81.1 ⁴	38.42 ¹⁶	48.7 ⁰
17.2	44.33 ¹⁶	43.5 ⁶	28.04 ³¹	60.9 ¹⁴	55.30 ¹⁵	80.4 ⁷	38.28 ¹⁴	48.7 ⁰
	13	7	28	18	12	10	11	0
27.1	44.20	42.8	27.76	59.1	55.18	79.4	38.17	48.7
Nov. 6.1	44.11 ⁹	41.9 ⁹	27.53 ²³	56.8 ²³	55.09 ⁹	78.1 ¹³	38.09 ⁸	48.8 ¹
16.1	44.07 ⁴	41.0 ⁹	27.35 ¹⁸	54.0 ²⁸	55.04 ⁵	76.6 ¹⁵	38.06 ³	49.0 ²
26.0	44.09 ²	40.0 ¹⁰	27.23 ¹²	50.9 ³¹	55.03 ¹	74.8 ¹⁸	38.08 ²	49.2 ²
Dec. 6.0	44.17 ⁸	39.1 ⁹	27.19 ⁴	47.6 ³³	55.07 ⁴	72.8 ²⁰	38.15 ⁷	49.6 ⁴
	14	9	3	35	9	21	11	5
16.0	44.31	38.2	27.22	44.1	55.16	70.7	38.26	50.1
26.0	44.51 ²⁰	37.5 ⁷	27.32 ¹⁰	40.5 ³⁶	55.30 ¹⁴	68.5 ²²	38.42 ¹⁶	50.7 ⁶
35.9	44.76 ²⁵	36.9 ⁶	27.48 ¹⁶	37.0 ³⁵	55.48 ¹⁸	66.3 ²²	38.62 ²⁰	51.4 ⁷
Sec δ, Tan δ	1.253	-0.755	1.638	+1.297	1.025	+0.224	1.037	-0.274
Mean Place	41°.949	28''.28	27°.976	55''.41	53°.722	81''.20	36°.210	40''.23
D'ψ α, Dω α	+0.02	-0.01	-0.03	+0.01	-0.01	0.00	+0.01	0.00
Dψ δ, Dω δ	-0.1	-1.0	-0.1	-1.0	-0.1	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Herculis. Mag. 3.8		η Pavonis. Mag. 3.6		ω Draconis. Mag. 4.9		β Ophiuchi. Mag. 2.9	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 17 36 s	° ' +46 2 "	h m 17 37 s	° ' -64 40 "	h m 17 37 s	° ' +68 47 "	h m 17 39 s	° ' + 4 35 "
Jan. 1.0	58.66	54.4	8.01	65.0	24.09	39.6	9.05	60.0
10.9	58.85 19	51.0 34	8.43 42	63.0 20	24.31 22	36.0 36	9.25 20	58.2 18
20.9	59.10 25	47.8 32	8.94 51	61.2 18	24.65 34	32.7 33	9.48 23	56.5 17
30.9	59.39 29	45.0 28	9.51 57	59.7 15	25.08 43	29.7 30	9.74 26	54.9 16
Feb. 9.8	59.71 32	42.6 24	10.12 61	58.6 11	25.59 51	27.2 25	10.02 28	53.5 14
	35	19	65	8	57	19	29	12
19.8	60.06	40.7	10.77	57.8	26.16	25.3	10.31	52.3
Mar. 1.8	60.43 37	39.4 13	11.44 67	57.4 4	26.78 62	24.0 13	10.61 30	51.5 8
11.8	60.80 37	38.7 7	12.12 68	57.3 1	27.42 64	23.4 6	10.91 30	51.0 5
21.7	61.18 38	38.7 0	12.80 68	57.5 2	28.07 65	23.4 0	11.21 30	50.9 1
31.7	61.55 37	39.3 6	13.47 67	58.1 6	28.70 63	24.1 7	11.50 29	51.1 2
	35	12	65	9	59	13	29	5
Apr. 10.7	61.90	40.5	14.12	59.0	29.29	25.4	11.79	51.6
20.7	62.23 33	42.2 17	14.73 61	60.2 12	29.83 54	27.3 19	12.07 28	52.4 8
30.6	62.53 30	44.4 22	15.30 57	61.6 14	30.30 47	29.7 24	12.33 26	53.5 11
May 10.6	62.79 26	47.0 26	15.82 52	63.3 17	30.69 39	32.4 27	12.56 23	54.8 13
20.6	63.01 22	49.9 29	16.28 46	65.2 19	30.99 30	35.5 31	12.77 21	56.3 15
	17	31	40	21	21	33	19	15
30.5	63.18	53.0	16.68	67.3	31.20	38.8	12.96	57.8
June 9.5	63.30 12	56.1 31	17.00 32	69.5 22	31.30 10	42.2 34	13.12 16	59.4 16
19.5	63.37 7	59.2 31	17.23 23	71.8 23	31.30 0	45.5 33	13.24 12	61.0 16
29.5	63.39 2	62.3 31	17.38 15	74.1 23	31.20 10	48.8 33	13.32 8	62.5 15
July 9.4	63.36 3	65.2 29	17.44 6	76.4 23	31.00 20	51.9 31	13.36 4	63.9 14
	9	26	3	21	30	28	0	13
19.4	63.27	67.8	17.41	78.5	30.70	54.7	13.36	65.2
29.4	63.13 14	70.2 24	17.29 12	80.4 19	30.31 39	57.2 25	13.33 3	66.3 11
Aug. 8.4	62.95 18	72.2 20	17.09 20	82.1 17	29.85 46	59.4 22	13.26 7	67.2 9
18.3	62.73 22	73.8 16	16.81 28	83.5 14	29.32 53	61.1 17	13.15 11	68.0 8
28.3	62.47 26	75.0 12	16.47 34	84.6 11	28.74 58	62.3 12	13.02 13	68.6 6
	28	7	38	7	62	7	15	4
Sept. 7.3	62.19	75.7	16.09	85.3	28.12	63.0	12.87	69.0
17.2	61.90 29	75.9 2	15.68 41	85.5 2	27.48 64	63.2 2	12.71 16	69.2 2
27.2	61.60 30	75.6 3	15.27 41	85.2 3	26.83 65	62.9 3	12.54 17	69.2 0
Oct. 7.2	61.31 29	74.9 7	14.87 40	84.5 7	26.20 63	62.1 8	12.38 16	68.9 3
17.2	61.04 27	73.7 12	14.51 36	83.4 11	25.60 60	60.8 13	12.23 15	68.4 5
	24	17	30	15	56	19	12	7
27.1	60.80	72.0	14.21	81.9	25.04	58.9	12.11	67.7
Nov. 6.1	60.60 20	69.8 22	13.98 23	80.0 19	24.55 49	56.6 23	12.02 9	66.8 5
16.1	60.45 15	67.3 25	13.84 14	77.9 21	24.15 40	53.8 28	11.97 5	65.7 11
26.1	60.36 9	64.4 29	13.80 4	75.6 23	23.85 30	50.7 31	11.97 0	64.4 15
Dec. 6.0	60.33 3	61.2 32	13.87 7	73.2 24	23.65 20	47.3 34	12.01 4	62.9 15
	3	34	18	24	8	36	9	15
16.0	60.36	57.8	14.05	70.8	23.57	43.7	12.10	61.2
26.0	60.45 9	54.4 34	14.33 28	68.5 23	23.61 4	40.1 36	12.24 14	59.4 1
35.9	60.61 16	51.0 34	14.70 37	66.4 21	23.76 15	36.5 36	12.42 18	57.6 1
Sec δ, Tan δ	1.441	+1.037	2.339	-2.114	2.765	+2.578	1.003	+0.080
Mean Place	60°.552	67'''.81	11°.394	60'''.84	27°.557	53'''.62	10°.462	70'''.42
D'ψ a, Dω a	-0.03	+0.01	+0.05	-0.01	-0.07	+0.02	0.00	0.00
Dψ δ, Dω δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϵ^1 Scorpii. Mag. 3.1		μ Herculis. Mag. 3.5		ψ Draconis. Mag. 4.9		γ Ophiuchi. Mag. 3.7	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 17 41	° ' -40 5	h m 17 43	° ' +27 45	h m 17 43	° ' +72 11	h m 17 43	° ' + 2 44
	s	"	s	"	s	"	s	"
Jan. 1.0	28.07	45.6	1.64	63.2	24.80	17.0	30.36	11.2
10.9	28.34 27	44.8 8	1.82 18	60.3 29	25.02 22	13.4 36	30.56 20	9.5 17
20.9	28.65 31	44.2 6	2.04 22	57.6 27	25.38 36	10.0 34	30.79 23	7.8 17
30.9	28.99 34	43.7 5	2.29 25	55.2 24	25.85 47	7.0 30	31.04 25	6.3 15
Feb. 9.9	29.36 37	43.4 3	2.57 28	53.1 21	26.42 57	4.5 25	31.32 28	5.0 13
	39	2	30	17	65	20	29	11
19.8	29.75	43.2	2.87	51.4	27.07	2.5	31.61	3.9
Mar. 1.8	30.15 40	43.1 1	3.18 31	50.2 12	27.78 71	1.1 14	31.91 30	3.1 8
11.8	30.55 40	43.2 1	3.50 32	49.5 7	28.52 74	0.4 7	32.21 30	2.6 5
21.7	30.95 40	43.4 2	3.82 32	49.3 2	29.27 75	0.3 1	32.51 30	2.4 2
31.7	31.34 39	43.7 3	4.13 31	49.7 4	30.00 73	0.9 6	32.81 30	2.6 2
	38	4	30	9	69	13	29	5
Apr. 10.7	31.72	44.1	4.43	50.6	30.69	2.2	33.10	3.1
20.7	32.09 37	44.6 5	4.72 29	52.0 14	31.32 63	4.0 18	33.38 28	3.9 8
30.6	32.44 35	45.2 6	4.99 27	53.8 18	31.87 55	6.3 23	33.64 26	4.9 10
May 10.6	32.76 32	45.9 7	5.23 24	55.9 21	32.33 46	9.0 27	33.88 24	6.1 12
20.6	33.05 29	46.7 8	5.44 21	58.2 23	32.68 35	12.0 30	34.10 22	7.5 14
	26	9	18	25	24	32	19	15
30.5	33.31	47.6	5.62	60.7	32.92	15.2	34.29	9.0
June 9.5	33.53 22	48.5 9	5.76 14	63.3 26	33.04 12	18.6 34	34.45 16	10.5 15
19.5	33.70 17	49.5 10	5.86 10	65.9 26	33.03 1	22.0 34	34.57 12	12.0 15
29.5	33.82 12	50.5 10	5.92 6	68.5 26	32.90 13	25.3 33	34.66 9	13.4 14
July 9.4	33.89 7	51.5 10	5.93 1	70.9 24	32.66 24	28.4 31	34.71 5	14.7 13
	2	10	3	22	36	28	1	12
19.4	33.91	52.5	5.90	73.1	32.30	31.2	34.72	15.9
29.4	33.88 3	53.5 10	5.83 7	75.0 19	31.84 46	33.7 25	34.69 3	16.9 10
Aug. 8.4	33.80 8	54.4 9	5.72 11	76.7 17	31.28 56	35.9 22	34.62 7	17.8 9
18.3	33.67 13	55.1 7	5.58 14	78.1 14	30.65 63	37.7 18	34.52 10	18.5 7
28.3	33.51 16	55.6 5	5.41 17	79.1 10	29.95 70	39.0 13	34.39 13	19.1 6
	19	3	19	6	75	8	15	4
Sept. 7.3	33.32	55.9	5.22	79.7	29.20	39.8	34.24	19.5
17.2	33.11 21	56.0 1	5.01 21	80.0 3	28.43 77	40.1 3	34.08 16	19.7 2
27.2	32.90 21	55.9 1	4.80 21	79.9 1	27.65 78	39.9 2	33.91 17	19.6 1
Oct. 7.2	32.70 20	55.5 4	4.60 20	79.4 5	26.88 77	39.1 8	33.75 16	19.4 2
17.2	32.52 18	54.9 6	4.41 19	78.4 10	26.14 74	37.8 13	33.61 14	19.0 4
	15	8	17	13	68	18	12	6
27.1	32.37	54.1	4.24	77.1	25.46	36.0	33.49	18.4
Nov. 6.1	32.26 11	53.1 10	4.11 13	75.4 17	24.86 60	33.7 23	33.40 9	17.5 9
16.1	32.20 6	52.1 10	4.02 9	73.3 21	24.35 51	31.0 27	33.35 5	16.5 10
26.1	32.21 1	51.0 11	3.98 4	71.0 23	23.95 40	28.0 30	33.34 1	15.3 12
Dec. 6.0	32.28 7	49.9 11	3.99 1	68.4 26	23.67 28	24.7 33	33.38 4	13.9 14
	13	11	6	28	14	36	9	16
16.0	32.41	48.8	4.05	65.6	23.53	21.1	33.47	12.3
26.0	32.59 18	47.8 10	4.16 11	62.7 29	23.53 0	17.4 37	33.60 13	10.7 16
35.9	32.83 24	47.0 8	4.31 15	59.8 29	23.67 14	13.8 36	33.78 18	9.0 17
Sec δ , Tan δ	1.307	-0.842	1.130	+0.527	3.269	+3.113	1.001	+0.048
Mean Place	29 ^s .973	39'''.28	3 ^s .184	75'''.32	28 ^s .955	30'''.54	31 ^s .784	21'''.39
D' ϕ α , D α α	+0.02	0.00	-0.01	0.00	-0.08	+0.01	0.00	0.00
D' ϕ δ , D α δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Ophiuchi. Mag. 3.5	
	Right Ascension.	Declination S
	h m	°
	17 54	- 9 4
	s	"
Jan. 1.0	12.72	58.8
10.9	12.92 ²⁰	59.8 ¹
20.9	13.15 ²³	60.7
30.9	13.41 ²⁶	61.6
Feb. 9.9	13.69 ²⁸	62.4
19.8	13.99 ³⁰	63.1
Mar. 1.8	14.29 ³⁰	63.7
11.8	14.60 ³¹	64.0
21.7	14.91 ³¹	64.1
31.7	15.22 ³¹	64.0
Apr. 10.7	15.52 ³⁰	63.7
20.7	15.81 ²⁹	63.2
30.6	16.09 ²⁸	62.6
May 10.6	16.35 ²⁶	61.9
20.6	16.59 ²⁴	61.1
30.6	16.80 ²¹	60.3
June 9.5	16.98 ¹⁸	59.4
19.5	17.13 ¹⁵	58.6
29.5	17.24 ¹¹	57.8
July 9.4	17.31 ⁷	57.1
19.4	17.33 ²	56.5
29.4	17.32 ¹	56.0
Aug. 8.4	17.27 ⁵	55.6
18.3	17.18 ⁹	55.3
28.3	17.06 ¹²	55.0
Sept. 7.3	16.92 ¹⁴	54.8
17.3	16.76 ¹⁶	54.7
27.2	16.60 ¹⁶	54.7
Oct. 7.2	16.44 ¹⁶	54.8
17.2	16.29 ¹⁵	55.0
27.1	16.17 ¹²	55.2
Nov. 6.1	16.08 ⁹	55.5
16.1	16.03 ⁵	55.9
26.1	16.02 ¹	56.5
Dec. 6.0	16.06 ⁴	57.2
16.0	16.15 ⁹	58.0
26.0	16.28 ¹³	58.8
36.0	16.46 ¹⁸	59.7
Sec δ , Tan δ	1.015	-0.17
Mean Place	14 ^s .187	49 ^m .47
D ⁺ ϕ α , D ₀ α	0.00	0.00
D ⁺ δ , D ₀ δ	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aræ. Mag. 3.9		γ Sagittarii. Mag. 3.1		70 Ophiuchi. Mag. 4.1		72 Oph Mag.
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.
	h m 17 59 s	° ' -50 5 "	h m 18 0 s	° ' -30 25 "	h m 18 1 s	° ' + 2 30 "	h m 18 3 s
Jan. 1.0	49.24	61.4	11.39	42.0	1.99	57.8	12.01
10.9	49.52 28	59.9 15	11.61 22	41.7 3	2.17 18	56.1 17	12.19 18
20.9	49.86 34	58.6 13	11.87 26	41.5 2	2.39 22	54.5 16	12.40 21
30.9	50.24 38	57.5 11	12.16 29	41.3 2	2.63 24	53.0 15	12.63 23
Feb. 9.9	50.65 41	56.6 9	12.48 32	41.2 1	2.89 26	51.7 13	12.89 26
	44	7	34	1	28	11	28
19.8	51.09	55.9	12.82	41.1	3.17	50.6	13.17
Mar. 1.8	51.54 45	55.4 5	13.17 35	41.1 0	3.47 30	49.8 8	13.46 29
11.8	52.00 46	55.1 3	13.53 36	41.1 0	3.77 30	49.3 5	13.76 30
21.8	52.47 47	55.0 1	13.89 36	41.1 0	4.07 30	49.1 2	14.06 30
31.7	52.94 47	55.2 2	14.24 35	41.1 0	4.37 30	49.3 2	14.36 30
	46	4	35	0	30	5	29
Apr. 10.7	53.40	55.6	14.59	41.1	4.67	49.8	14.65
20.7	53.84 44	56.1 5	14.93 34	41.2 1	4.95 28	50.6 8	14.94 29
30.6	54.26 42	56.8 7	15.25 32	41.3 1	5.22 27	51.6 10	15.21 27
May 10.6	54.65 39	57.7 9	15.55 30	41.4 1	5.47 25	52.8 12	15.46 25
20.6	55.01 36	58.8 11	15.83 28	41.6 2	5.70 23	54.2 14	15.69 23
	32	12	25	2	21	15	20
30.6	55.33	60.0	16.08	41.8	5.91	55.7	15.89
June 9.5	55.60 27	61.4 14	16.30 22	42.1 3	6.09 18	57.2 15	16.06 17
19.5	55.82 22	62.9 15	16.48 18	42.5 4	6.23 14	58.7 15	16.20 14
29.5	55.98 16	64.4 15	16.61 13	42.9 4	6.34 11	60.1 14	16.30 10
July 9.5	56.08 10	66.0 16	16.69 8	43.4 5	6.40 6	61.4 13	16.36 6
	3	16	4	5	2	12	2
19.4	56.11	67.6	16.73	43.9	6.42	62.6	16.38
29.4	56.08 3	69.1 15	16.72 1	44.4 5	6.41 1	63.7 11	16.36 2
Aug. 8.4	56.00 8	70.4 13	16.67 5	44.9 5	6.36 5	64.6 9	16.30 6
18.3	55.86 14	71.5 11	16.58 9	45.3 4	6.27 9	65.4 8	16.20 10
28.3	55.67 19	72.4 9	16.45 13	45.7 4	6.15 12	66.0 6	16.07 13
	23	6	16	3	15	4	15
Sept. 7.3	55.44	73.0	16.29	46.0	6.00	66.4	15.92
17.3	55.19 25	73.4 4	16.11 18	46.1 1	5.84 16	66.6 2	15.75 17
27.2	54.93 26	73.4 0	15.93 18	46.1 0	5.67 17	66.6 0	15.58 17
Oct. 7.2	54.67 26	73.1 3	15.75 18	46.0 1	5.51 16	66.3 3	15.41 17
17.2	54.43 24	72.4 7	15.58 17	45.7 3	5.36 15	65.9 4	15.25 16
	20	9	14	4	13	6	14
27.2	54.23	71.5	15.44	45.3	5.23	65.3	15.11
Nov. 6.1	54.08 15	70.3 12	15.34 10	44.9 4	5.13 10	64.5 8	15.00 11
16.1	53.98 10	68.9 14	15.28 6	44.4 5	5.07 6	63.5 10	14.93 7
26.1	53.95 3	67.3 16	15.27 1	43.8 6	5.05 2	62.3 12	14.90 3
Dec. 6.0	53.99 4	65.7 16	15.31 4	43.3 5	5.08 3	61.0 13	14.92 2
	11	17	9	5	7	15	6
16.0	54.10	64.0	15.40	42.8	5.15	59.5	14.98
26.0	54.28 18	62.4 16	15.55 15	42.3 5	5.26 11	57.9 16	15.09 11
36.0	54.53 25	60.8 16	15.75 20	41.9 4	5.42 16	56.3 16	15.24 15
Sec δ , Tan δ	1.559	-1.196	1.160	-0.587	1.001	+0.044	1.014
Mean Place	51 ^s .487	54 ^{''} .59	13 ^s .074	33 ^{''} .89	3 ^s .433	67 ^{''} .96	13 ^s .475
D' ψ a , D ₀ a	+0.03	0.00	+0.02	0.00	0.00	0.00	0.00
D ψ δ , D ₀ δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	36 Draconis. Mag. 5.0		δ Sagittarii. Mag. 2.8		η Serpentis. Mag. 3.4		ε Sagittarii. Mag. 2.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 18 13 s	° ' +64 21 "	h m 18 15 s	° ' -29 51 "	h m 18 16 s	° ' - 2 55 "	h m 18 18 s	° ' -34 25 "
Jan. 1.0	20.56	52.2	23.79	66.4	46.98	29.5	22.09	44.3
11.0	20.70 ¹⁴	48.6 ³⁶	24.00 ²¹	66.1 ³	47.15 ¹⁷	30.8 ¹³	22.30 ²¹	43.6 ⁷
20.9	20.93 ²³	45.2 ³⁴	24.25 ²⁵	65.8 ³	47.35 ²⁰	32.1 ¹³	22.55 ²⁵	43.0 ⁶
30.9	21.24 ³¹	42.0 ³²	24.53 ²⁸	65.5 ³	47.58 ²³	33.3 ¹²	22.84 ²⁹	42.5 ⁵
Feb. 9.9	21.63 ³⁹	39.2 ²⁸	24.83 ³⁰	65.3 ²	47.84 ²⁶	34.3 ¹⁰	23.16 ³²	42.1 ⁴
	45 ²³		32 ²		28 ⁹		34 ⁴	
19.8	22.08	36.9	25.15	65.1	48.12	35.2	23.50	41.7
Mar. 1.8	22.58 ⁵⁰	35.2 ¹⁷	25.49 ³⁴	65.0 ¹	48.41 ²⁹	35.8 ⁶	23.85 ³⁵	41.4 ³
11.8	23.11 ⁵³	34.1 ¹¹	25.84 ³⁵	64.8 ²	48.70 ²⁹	36.1 ³	24.21 ³⁶	41.2 ²
21.8	23.66 ⁵⁵	33.7 ⁴	26.20 ³⁶	64.7 ¹	49.00 ³⁰	36.2 ¹	24.58 ³⁷	41.0 ²
31.7	24.21 ⁵⁵	34.0 ³	26.55 ³⁵	64.6 ¹	49.31 ³¹	36.0 ²	24.95 ³⁷	40.8 ²
	53 ⁹		35 ²		30 ⁴		37 ¹	
Apr. 10.7	24.74	34.9	26.90	64.4	49.61	35.6	25.32	40.7
20.7	25.25 ⁵¹	36.4 ¹⁵	27.24 ³⁴	64.3 ¹	49.90 ²⁹	34.9 ⁷	25.68 ³⁶	40.7 ⁰
30.7	25.71 ⁴⁶	38.5 ²¹	27.57 ³³	64.2 ¹	50.18 ²⁸	34.0 ⁹	26.03 ³⁵	40.8 ¹
May 10.6	26.11 ⁴⁰	41.0 ²⁵	27.89 ³²	64.2 ⁰	50.45 ²⁷	32.9 ¹¹	26.36 ³³	40.9 ¹
20.6	26.45 ³⁴	43.9 ²⁹	28.18 ²⁹	64.2 ⁰	50.69 ²⁴	31.7 ¹²	26.66 ³⁰	41.1 ²
	27 ³²		26 ¹		22 ¹³		28 ³	
30.6	26.72	47.1	28.44	64.3	50.91	30.4	26.94	41.4
June 9.5	26.91 ¹⁹	50.4 ³³	28.67 ²³	64.5 ²	51.10 ¹⁹	29.1 ¹³	27.18 ²⁴	41.8 ⁴
19.5	27.01 ¹⁰	53.8 ³⁴	28.86 ¹⁹	64.8 ³	51.26 ¹⁶	27.9 ¹²	27.38 ²⁰	42.3 ⁵
29.5	27.02 ¹	57.2 ³⁴	29.01 ¹⁵	65.2 ⁴	51.38 ¹²	26.7 ¹²	27.54 ¹⁶	42.9 ⁶
July 9.5	26.94 ⁸	60.5 ³³	29.11 ¹⁰	65.6 ⁴	51.46 ⁸	25.6 ¹¹	27.65 ¹¹	43.6 ⁷
	16 ³²		6 ⁴		5 ⁴	10 ⁷	6 ⁷	
19.4	26.78	63.7	29.17	66.0	51.51	24.6	27.71	44.3
29.4	26.54 ²⁴	66.6 ²⁹	29.18 ¹	66.5 ⁵	51.51 ⁰	23.7 ⁹	27.72 ¹	45.0 ⁷
Aug. 8.4	26.23 ³¹	69.1 ²⁵	29.14 ⁴	67.0 ⁵	51.47 ⁴	22.9 ⁸	27.68 ⁴	45.7 ⁷
18.4	25.85 ³⁸	71.3 ²²	29.05 ⁹	67.5 ⁵	51.39 ⁸	22.3 ⁶	27.60 ⁸	46.4 ⁷
28.3	25.41 ⁴⁴	73.0 ¹⁷	28.93 ¹²	67.9 ⁴	51.28 ¹¹	21.9 ⁴	27.47 ¹³	47.0 ⁶
	48 ¹³		15 ³		14 ³		16 ⁵	
Sept. 7.3	24.93	74.3	28.78	68.2	51.14	21.6	27.31	47.5
17.3	24.42 ⁵¹	75.1 ⁸	28.61 ¹⁷	68.4 ²	50.98 ¹⁶	21.4 ²	27.13 ¹⁸	47.8 ³
27.2	23.89 ⁵³	75.4 ³	28.43 ¹⁸	68.5 ¹	50.82 ¹⁶	21.4 ⁰	26.93 ²⁰	47.9 ¹
Oct. 7.2	23.36 ⁵³	75.1 ³	28.24 ¹⁹	68.5 ⁰	50.66 ¹⁶	21.5 ¹	26.74 ¹⁹	47.8 ¹
17.2	22.85 ⁵¹	74.3 ⁸	28.07 ¹⁷	68.3 ²	50.51 ¹⁵	21.8 ³	26.56 ¹⁸	47.6 ²
	48 ¹⁴		15 ³		14 ⁴		16 ⁴	
27.2	22.37	72.9	27.92	68.0	50.37	22.2	26.40	47.2
Nov. 6.1	21.93 ⁴⁴	71.0 ¹⁹	27.81 ¹¹	67.6 ⁴	50.26 ¹¹	22.8 ⁶	26.28 ¹²	46.6 ⁶
16.1	21.56 ³⁷	68.7 ²³	27.74 ⁷	67.1 ⁵	50.19 ⁷	23.5 ⁷	26.20 ⁸	46.0 ⁶
26.1	21.26 ³⁰	66.0 ²⁷	27.72 ²	66.6 ⁵	50.16 ³	24.4 ⁹	26.17 ³	45.3 ⁷
Dec. 6.1	21.05 ²¹	62.9 ³¹	27.75 ³	66.1 ⁵	50.18 ²	25.4 ¹⁰	26.19 ²	44.5 ⁸
	12 ³⁴		8 ⁵		6 ⁵	11 ⁸	8 ⁸	
16.0	20.93	59.5	27.83	65.6	50.24	26.5	26.27	43.7
26.0	20.91 ²	55.9 ³⁶	27.96 ¹³	65.1 ⁵	50.34 ¹⁰	27.7 ¹²	26.40 ¹³	42.9 ⁸
36.0	20.98 ⁷	52.3 ³⁶	28.14 ¹⁸	64.7 ⁴	50.49 ¹⁵	29.0 ¹³	26.59 ¹⁹	42.2 ⁷
Sec δ, Tan δ	2.311	+2.084	1.153	-0.574	1.001	-0.051	1.212	-0.685
Mean Place	23°.769	63''.52	25°.460	57''.64	48°.436	19''.59	23°.829	35''.54
D'ψ α, Dω α	-0.06	-0.01	+0.02	0.00	0.00	0.00	+0.02	0.00
Dψ δ, Dω δ	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	100 Herculis. Mag. 3.9		α Telescopii. Mag. 3.8		λ Sagittarii. Mag. 2.9		χ Draconis. Mag. 3.7	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 18 19	° ' +21 43	h m 18 20	° ' -46 1	h m 18 22	° ' -25 28	h m 18 22	° ' +72 41
	s	"	s	"	s	"	s	"
Jan. 1.0	57.85	35.0	29.31	11.0	34.50	24.0	32.96	32.6
11.0	58.00 15	32.5 25	29.55 24	9.6 14	34.69 19	23.9 1	33.06 10	29.0 36
20.9	58.19 19	30.0 25	29.84 29	8.4 12	34.92 23	23.8 1	33.31 25	25.5 35
30.9	58.41 22	27.7 23	30.17 33	7.3 11	35.18 26	23.8 0	33.69 38	22.3 32
Feb. 9.9	58.66 25	25.7 20	30.54 37	6.3 10	35.47 29	23.8 0	34.18 49	19.4 29
	27	16	39	8	31	1	59	24
19.8	58.93	24.1	30.93	5.5	35.78	23.7	34.77	17.0
Mar. 1.8	59.22 29	22.9 12	31.34 41	4.9 6	36.10 32	23.6 1	35.44 67	15.2 18
11.8	59.52 30	22.1 8	31.77 43	4.4 5	36.43 33	23.5 1	36.17 73	14.0 12
21.8	59.82 30	21.8 3	32.20 43	4.1 3	36.77 34	23.3 2	36.93 76	13.4 6
31.7	60.13 31	22.0 2	32.64 44	3.9 2	37.12 35	23.1 2	37.70 77	13.5 1
	31	7	43	0	34	2	75	8
Apr. 10.7	60.44	22.7	33.07	3.9	37.46	22.9	38.45	14.3
20.7	60.74 30	23.9 12	33.49 42	4.1 2	37.79 33	22.6 3	39.15 70	15.7 14
30.7	61.02 28	25.4 15	33.90 41	4.5 4	38.11 32	22.3 3	39.79 64	17.6 19
May 10.6	61.29 27	27.3 19	34.29 39	5.0 5	38.42 31	22.1 2	40.35 56	20.0 24
20.6	61.53 24	29.5 22	34.64 35	5.7 7	38.70 28	21.9 2	40.82 47	22.8 28
	21	23	32	9	26	2	36	31
30.6	61.74	31.8	34.96	6.6	38.96	21.7	41.18	25.9
June 9.5	61.92 18	34.2 24	35.24 28	7.6 10	39.19 23	21.6 1	41.42 24	29.2 33
19.5	62.06 14	36.7 25	35.47 23	8.8 12	39.38 19	21.6 0	41.53 11	32.7 35
29.5	62.17 11	39.1 24	35.65 18	10.1 13	39.53 15	21.7 1	41.51 2	36.1 34
July 9.5	62.23 6	41.5 24	35.77 12	11.4 13	39.63 10	21.8 1	41.37 14	39.4 33
	2	22	6	13	6	2	26	32
19.4	62.25	43.7	35.83	12.7	39.69	22.0	41.11	42.6
29.4	62.23 2	45.7 20	35.84 1	14.0 13	39.70 1	22.3 3	40.73 38	45.6 30
Aug. 8.4	62.16 7	47.4 17	35.79 5	15.3 13	39.67 3	22.6 3	40.24 49	48.2 26
18.4	62.05 11	48.9 15	35.68 11	16.4 11	39.60 7	22.9 3	39.66 58	50.5 23
28.3	61.91 14	50.1 12	35.52 16	17.3 9	39.49 11	23.2 3	39.00 66	52.3 18
	16	9	19	7	14	2	73	14
Sept. 7.3	61.75	51.0	35.33	18.0	39.35	23.4	38.27	53.7
17.3	61.57 18	51.5 5	35.11 22	18.5 5	39.19 16	23.6 2	37.50 77	54.6 9
27.2	61.38 19	51.7 2	34.87 24	18.7 2	39.01 18	23.7 1	36.70 80	55.0 4
Oct. 7.2	61.18 20	51.5 2	34.63 24	18.6 1	38.83 18	23.7 0	35.90 80	54.9 1
17.2	60.99 19	51.0 5	34.41 22	18.2 4	38.66 17	23.6 1	35.11 79	54.3 6
	16	9	19	7	14	1	75	12
27.2	60.83	50.1	34.22	17.5	38.52	23.5	34.36	53.1
Nov. 6.1	60.69 14	48.8 13	34.06 16	16.6 9	38.41 11	23.3 2	33.67 69	51.4 17
16.1	60.59 10	47.2 16	33.95 11	15.5 11	38.34 7	23.1 2	33.06 61	49.2 22
26.1	60.53 6	45.3 19	33.90 5	14.2 13	38.31 3	22.8 3	32.55 51	46.6 26
Dec. 6.1	60.51 2	43.2 21	33.92 2	12.8 14	38.33 2	22.5 3	32.15 40	43.6 30
	3	23	8	15	7	2	27	33
16.0	60.54	40.9	34.00	11.3	38.40	22.3	31.88	40.3
26.0	60.62 8	38.4 25	34.14 14	9.8 15	38.52 12	22.1 2	31.75 13	36.8 35
36.0	60.74 12	35.9 25	34.35 21	8.4 14	38.68 16	21.9 2	31.77 2	33.2 36
Sec δ , Tan δ	1.076	+0.399	1.440	-1.036	1.108	-0.476	3.361	+3.209
Mean Place	59 ^s .417	45 ^{''} .60	31 ^s .365	2 ^{''} .63	36 ^s .101	14 ^{''} .78	37 ^s .666	43 ^{''} .00
$D'\phi\alpha$, $D_\alpha\alpha$	-0.01	0.00	+0.03	+0.01	+0.01	0.00	-0.08	-0.02
$D'\phi\delta$, $D_\delta\delta$	0.0	-1.0	0.0	-1.0	0.0	-1.0	0.0	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♎ Serpentis. Mag. 5.4		♏ Aquilæ. Mag. 4.1		♐ Pavonis. Mag. 4.1		♑ Lyreæ. Mag. 0.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 18 25 s	° ' - 2 2 "	h m 18 30 s	° ' - 8 18 "	h m 18 32 s	° ' -71 30 "	h m 18 33 s	° ' +38 41 "
Jan. 1.0	7.85	42.4	26.89	30.4	48.08	23.5	57.69	57.6
11.0	8.01 16	43.7 13	27.05 16	31.3 9	48.46 38	20.8 27	57.81 12	54.5 31
20.9	8.21 20	45.0 13	27.25 20	32.2 9	48.96 50	18.3 25	57.98 17	51.4 31
30.9	8.44 23	46.2 12	27.48 23	33.0 8	49.56 60	16.0 23	58.19 21	48.5 29
Feb. 9.9	8.69 25	47.2 10	27.73 25	33.8 8	50.25 69	13.9 21	58.44 25	46.0 25
	27	9	27	6	76	18	29	21
19.9	8.96	48.1	28.00	34.4	51.01	12.1	58.73	43.9
Mar. 1.8	9.24 28	48.7 6	28.29 29	34.8 4	51.83 82	10.7 14	59.04 31	42.3 16
11.8	9.53 29	49.0 3	28.59 30	35.0 2	52.69 86	9.7 10	59.37 33	41.2 11
21.8	9.83 30	49.1 1	28.89 30	35.0 0	53.58 89	9.0 7	59.71 34	40.7 5
31.7	10.14 31	48.9 2	29.20 31	34.7 3	54.47 89	8.7 3	60.05 34	40.8 1
	30	5	31	5	88	1	34	7
Apr. 10.7	10.44	48.4	29.51	34.2	55.35	8.8	60.39	41.5
20.7	10.74 30	47.6 8	29.82 31	33.5 7	56.22 87	9.3 5	60.72 33	42.8 13
30.7	11.02 28	46.6 10	30.11 29	32.7 8	57.05 83	10.2 9	61.04 32	44.6 18
May 10.6	11.29 27	45.5 11	30.39 28	31.8 9	57.83 78	11.4 12	61.34 30	46.8 22
20.6	11.54 25	44.2 13	30.65 26	30.8 10	58.54 71	12.9 15	61.61 27	49.3 25
	23	14	24	10	64	18	23	28
30.6	11.77	42.8	30.89	29.8	59.18	14.7	61.84	52.1
June 9.6	11.97 20	41.4 14	31.10 21	28.7 11	59.72 54	16.8 21	62.03 19	55.1 30
19.5	12.14 17	40.1 13	31.28 18	27.6 11	60.16 44	19.1 23	62.18 15	58.2 31
29.5	12.27 13	38.8 13	31.42 14	26.6 10	60.48 32	21.5 24	62.28 10	61.3 31
July 9.5	12.36 9	37.6 12	31.52 10	25.8 8	60.68 20	24.0 25	62.33 5	64.3 30
	5	11	6	7	8	25	0	29
19.4	12.41	36.5	31.58	25.1	60.76	26.5	62.33	67.2
29.4	12.41 0	35.5 10	31.59 1	24.4 7	60.71 5	29.0 25	62.28 5	69.9 27
Aug. 8.4	12.38 3	34.7 8	31.56 3	23.8 6	60.54 17	31.3 23	62.19 9	72.3 24
18.4	12.31 7	34.0 7	31.50 6	23.4 4	60.25 29	33.3 20	62.05 14	74.3 20
28.3	12.20 11	33.5 5	31.40 10	23.1 3	59.86 39	35.0 17	61.87 18	76.0 17
	13	4	13	2	47	13	21	13
Sept. 7.3	12.07	33.1	31.27	22.9	59.39	36.3	61.66	77.3
17.3	11.92 15	32.9 2	31.12 15	22.8 1	58.86 53	37.2 9	61.42 24	78.2 9
27.3	11.76 16	32.9 0	30.96 16	22.8 0	58.29 57	37.7 5	61.17 25	78.6 4
Oct. 7.2	11.60 16	33.0 1	30.80 16	22.9 1	57.71 58	37.7 0	60.92 25	78.6 0
17.2	11.44 16	33.2 2	30.64 16	23.1 2	57.15 56	37.1 6	60.67 25	78.1 5
	14	4	14	3	52	11	23	10
27.2	11.30	33.6	30.50	23.4	56.63	36.0	60.44	77.1
Nov. 6.1	11.19 11	34.2 6	30.39 11	23.8 4	56.19 44	34.4 16	60.24 20	75.7 14
16.1	11.12 7	34.9 7	30.31 8	24.2 4	55.84 35	32.5 19	60.08 16	73.9 18
26.1	11.08 4	35.8 9	30.27 4	24.8 6	55.61 23	30.2 23	59.96 12	71.7 22
Dec. 6.1	11.09 1	36.8 10	30.28 1	25.5 7	55.51 10	27.7 25	59.89 7	69.1 26
	5	11	6	8	3	27	2	29
16.0	11.14	37.9	30.34	26.3	55.54	25.0	59.87	66.2
26.0	11 24 10	39.1 12	30.44 10	27.1 8	55.71 17	22.2 28	59.90 3	63.2 30
36.0	11.38 14	40.4 13	30.58 14	28.0 9	56.01 30	19.4 28	59.99 9	60.1 31
Sec δ, Tan δ	1.001	-0.036	1.011	-0.146	3.153	-2.990	1.281	+0.801
Mean Place	9 ^s .309	32 ^{''} .45	28 ^s .361	20 ^{''} .46	52 ^s .355	15 ^{''} .08	59 ^s .569	67 ^{''} .61
D'ψ a, D _∞ a	0.00	0.00	0.00	0.00	+0.08	+0.03	-0.02	-0.01
Dψ δ, D _∞ δ	0.0	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Aquilæ. Mag. 4.7		♐ Sagittarii. Mag. 3.3		♊ Hercules. Mag. 4.3		♑ Aquilæ. Mag. 4.5	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 18 37 s	° ' — 9 8 "	h m 18 40 s	° ' —27 4 "	h m 18 41 s	° ' +20 27 "	h m 18 42 s	° ' — 4 50 "
Jan. 1.0	29.20	21.7 8	11.66	61.7 3	53.42	34.5 25	32.04	40.3 11
11.0	29.36 16	22.5 8	11.84 18	61.4 3	53.55 13	32.0 25	32.19 15	41.4 10
20.9	29.55 19	23.3 8	12.06 22	61.1 3	53.72 17	29.6 24	32.37 18	42.4 10
30.9	29.77 22	24.1 8	12.31 25	60.8 3	53.92 20	27.4 22	32.58 21	43.4 9
Feb. 9.9	30.02 25	24.8 7	12.58 27	60.6 2	54.15 23	25.4 20	32.82 24	44.3 7
	27	5	30	3	25	16	26	
19.9	30.29	25.3 3	12.88	60.3 3	54.40	23.8 13	33.08	45.0 4
Mar. 1.8	30.57 28	25.6 1	13.20 32	60.0 3	54.67 27	22.5 8	33.36 28	45.4 2
11.8	30.87 30	25.7 0	13.53 33	59.7 3	54.96 29	21.7 3	33.65 29	45.6 0
21.8	31.18 31	25.7 3	13.87 34	59.4 3	55.26 30	21.4 1	33.95 30	45.6 3
31.8	31.49 31	25.4 5	14.22 34	59.1 4	55.57 31	21.5 6	34.25 31	45.3 5
Apr. 10.7	31.80	24.9 7	14.56	58.7 4	55.88	22.1 11	34.56	44.8 8
20.7	32.10 30	24.2 8	14.90 34	58.3 4	56.18 30	23.2 14	34.86 30	44.0 10
30.7	32.40 30	23.4 10	15.24 34	57.9 3	56.47 29	24.6 18	35.16 28	43.0 11
May 10.6	32.68 28	22.4 10	15.56 32	57.6 3	56.75 28	26.4 21	35.44 27	41.9 12
20.6	32.95 25	21.4 11	15.86 28	57.3 2	57.01 23	28.5 23	35.71 24	40.7 13
30.6	33.20	20.3 10	16.14	57.1 1	57.24 20	30.8 24	35.95 22	39.4 13
June 9.6	33.42 18	19.3 10	16.38 24	57.0 1	57.44 16	33.2 25	36.17 18	38.1 12
19.5	33.60 14	18.3 9	16.59 17	56.9 1	57.60 13	35.7 24	36.35 15	36.9 12
29.5	33.74 11	17.4 8	16.76 13	57.0 2	57.73 9	38.1 23	36.50 11	35.7 11
July 9.5	33.85 7	16.5 6	16.89 8	57.2 3	57.82 4	40.5 23	36.61 7	34.6 10
19.5	33.92 2	15.7 5	16.97 3	57.5 3	57.86 1	42.8 21	36.68 2	33.6 9
29.4	33.94 2	15.1 4	17.00 2	57.8 4	57.85 5	44.9 18	36.70 2	32.7 7
Aug. 8.4	33.92 6	14.6 4	16.98 6	58.2 4	57.80 8	46.7 16	36.68 6	32.0 6
18.4	33.86 10	14.2 3	16.92 10	58.6 4	57.72 12	48.3 13	36.62 10	31.4 5
28.3	33.76 12	13.9 2	16.82 14	59.0 4	57.60 15	49.6 10	36.52 12	30.9 3
Sept. 7.3	33.64 15	13.7 1	16.68 16	59.4 3	57.45 18	50.6 6	36.40 15	30.6 2
17.3	33.49 16	13.6 0	16.52 17	59.7 2	57.27 19	51.2 3	36.25 16	30.4 0
27.3	33.33 16	13.6 1	16.35 18	59.9 1	57.08 19	51.5 0	36.09 16	30.4 1
Oct. 7.2	33.17 16	13.7 2	16.17 15	60.0 0	56.89 18	51.5 4	35.93 16	30.5 2
17.2	33.01 14	13.9 3	16.00 15	60.0 2	56.71 17	51.1 7	35.77 14	30.7 3
27.2	32.87 12	14.2 3	15.85 13	59.8 2	56.54 15	50.4 10	35.63 11	31.0 5
Nov. 6.2	32.75 8	14.5 4	15.72 9	59.6 3	56.39 11	49.4 14	35.52 9	31.5 6
16.1	32.67 4	14.9 5	15.63 4	59.3 3	56.28 8	48.0 17	35.43 5	32.1 7
26.1	32.63 1	15.4 6	15.59 0	59.0 3	56.20 3	46.3 20	35.38 0	32.8 8
Dec. 6.1	32.64 5	16.0 7	15.59 5	58.7 4	56.17 1	44.3 22	35.38 4	33.6 9
16.0	32.69 9	16.7 8	15.64 10	58.3 4	56.18 6	42.1 23	35.42 8	34.5 10
26.0	32.78 13	17.5 8	15.74 15	57.9 3	56.24 10	39.8 24	35.50 13	35.5 10
36.0	32.91	18.3	15.89	57.6	56.34		35.63	36.5
Sec δ, Tan δ	1.013	—0.161	1.123	—0.511	1.067	+0.373	1.004	—0.085
Mean Place	30°.671	11''.73	13°.269	51''.82	55°.000	44''.28	33°.500	30''.32
D'ψ a, D _∞ a	0.00	0.00	+0.01	+0.01	—0.01	0.00	0.00	0.00
Dψ δ, D _∞ δ	+0.1	—1.0	+0.1	—1.0	+0.1	—1.0	+0.1	—1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	λ Pavonis. Mag. 4.4			β Lyrae. Var. 3.4-4.1			50 Draconis. Mag. 5.4			σ Sagittarii. Mag. 2.1		
	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination N.	Right Ascension.		Declination S.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	18	44	-62 17	18	46	+33 15	18	49	+75 19	18	49	-26 24
	s		"	s		"	s		"	s		"
Jan. 1.0	6.62		27.9	50.29		30.4	5.50		45.8	50.66		31.0
11.0	6.89	27	25.6 23	50.40	11	27.5 29	5.49	1	42.3 35	50.82	16	30.7 3
20.9	7.24	35	23.4 22	50.55	15	24.6 29	5.65	16	38.8 35	51.02	20	30.4 3
30.9	7.65	41	21.3 21	50.74	19	21.9 27	5.98	33	35.5 33	51.26	24	30.1 3
Feb. 9.9	8.13	48	19.4 19	50.97	23	19.5 24	6.45	47	32.5 30	51.53	27	29.8 3
		53	16		26	21		60	26		29	3
19.9	8.66		17.8	51.23		17.4	7.05		29.9	51.82		29.5
Mar. 1.8	9.23	57	16.4 14	51.52	29	15.8 16	7.76	71	27.8 21	52.13	31	29.2 3
11.8	9.82	59	15.3 11	51.83	31	14.7 11	8.56	80	26.3 15	52.45	32	28.8 4
21.8	10.43	61	14.5 8	52.15	32	14.2 5	9.42	86	25.4 9	52.78	33	28.4 4
31.8	11.05	62	14.0 5	52.48	33	14.3 1	10.30	88	25.2 2	53.12	34	27.9 5
		63	2		33	6		88	4		35	5
Apr. 10.7	11.68		13.8	52.81		14.9	11.18		25.6	53.47		27.4
20.7	12.30	62	14.0 2	53.13	32	16.0 11	12.02	84	26.7 11	53.81	34	26.9 5
30.7	12.89	59	14.5 5	53.44	31	17.6 16	12.80	78	28.3 16	54.15	34	26.5 4
May 10.6	13.45	56	15.3 8	53.74	30	19.7 21	13.50	70	30.5 22	54.48	33	26.1 4
20.6	13.98	53	16.4 11	54.01	27	22.1 24	14.10	60	33.1 26	54.78	30	25.7 4
		48	13		24	27		48	30		28	3
30.6	14.46		17.7	54.25		24.8	14.58		36.1	55.06		25.4
June 9.6	14.88	42	19.3 16	54.45	20	27.6 28	14.92	34	39.3 32	55.31	25	25.2 2
19.5	15.23	35	21.1 18	54.62	17	30.5 29	15.12	20	42.7 34	55.53	22	25.1 1
29.5	15.50	27	23.1 20	54.74	12	33.5 30	15.17	5	46.2 35	55.71	18	25.1 0
July 9.5	15.69	19	25.2 21	54.81	7	36.4 29	15.08	9	49.6 34	55.84	13	25.1 1
		10	21		3	28		24	33		9	2
19.5	15.79		27.3	54.84		39.2	14.84		52.9	55.93		25.4
29.4	15.80	1	29.4 21	54.82	2	41.8 26	14.46	38	56.1 32	55.97	4	25.7 3
Aug. 8.4	15.73	7	31.4 20	54.75	7	44.1 23	13.95	51	59.0 29	55.96	1	26.1 4
18.4	15.58	15	33.3 19	54.63	12	46.1 20	13.31	64	61.6 26	55.91	5	26.5 4
28.3	15.35	23	34.9 16	54.48	15	47.8 17	12.57	74	63.8 22	55.82	9	26.9 4
		29	13		18	13		82	18		13	3
Sept. 7.3	15.06		36.2	54.30		49.1	11.75		65.6	55.69		27.2
17.3	14.72	34	37.1 9	54.09	21	50.0 9	10.86	89	67.0 14	55.53	16	27.5 3
27.3	14.35	37	37.6 5	53.87	22	50.5 5	9.92	94	67.9 9	55.36	17	27.8 3
Oct. 7.2	13.97	38	37.7 1	53.64	23	50.6 1	8.96	96	68.2 3	55.18	18	27.9 1
17.2	13.60	37	37.4 3	53.41	23	50.3 3	8.01	95	68.0 2	55.01	17	28.0 1
		34	8		21	8		92	7		15	1
27.2	13.26		36.6	53.20		49.5	7.09		67.3	54.86		27.9
Nov. 6.2	12.97	29	35.4 12	53.02	18	48.3 12	6.22	87	66.0 13	54.73	13	27.8 1
16.1	12.74	23	33.8 16	52.87	15	46.6 17	5.42	80	64.2 18	54.63	10	27.6 2
26.1	12.59	15	31.9 19	52.76	11	44.6 20	4.72	70	62.0 22	54.58	5	27.3 3
Dec. 6.1	12.53	6	29.8 21	52.69	7	42.3 23	4.15	57	59.3 27	54.58	0	27.0 3
		3	23		2	26		42	31		4	4
16.0	12.56		27.5	52.67		39.7	3.73		56.2	54.62		26.6
26.0	12.68	12	25.1 24	52.70	3	36.9 28	3.46	27	52.9 33	54.71	9	26.3 3
36.0	12.90	22	22.7 24	52.78	8	34.0 29	3.35	11	49.4 35	54.85	14	26.0 3
Sec δ, Tan δ	2.151		-1.904	1.196		+0.656	3.949		+3.820	1.116		-0.497
Mean Place	9 ^h .523		18 ^m .37	52 ^h .060		39 ^m .82	11 ^h .264		53 ^m .85	52 ^h .234		20 ^m .71
D'ψ a, Dω a	+0.05		+0.02	-0.02		-0.01	-0.10		-0.05	+0.01		+0.01
Dψ δ, Dω δ	+0.1		-1.0	+0.1		-1.0	+0.1		-1.0	+0.1		-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Draconis. Mag. 4.8		♎ Serpentis <i>pr.</i> Mag. 4.5		♌ Lyrae. Var. 4.0-4.7		♏ Aquilæ. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 18 49 s	° ' " +59 16 "	h m 18 51 s	° ' " + 4 5 "	h m 18 52 s	° ' " +43 49 "	h m 18 55 s	° ' " +14 56 "
Jan. 1.0	52.28	45.9	52.18	12.8	39.22	42.9	38.88	48.2
11.0	52.35 7	42.4 35	52.31 13	11.2 16	39.31 9	39.6 33	39.00 12	46.1 21
21.0	52.49 14	38.9 35	52.48 17	9.6 16	39.45 14	36.4 32	39.15 15	44.0 21
30.9	52.71 22	35.6 33	52.68 20	8.2 14	39.64 19	33.4 30	39.34 19	42.0 20
Feb. 9.9	53.00 29	32.6 30	52.90 22	7.0 12	39.88 24	30.7 27	39.56 22	40.3 17
	35	25	25	10	28	23	25	15
19.9	53.35	30.1	53.15	6.0	40.16	28.4	39.81	38.8
Mar. 1.8	53.75 40	28.1 20	53.42 27	5.2 8	40.47 31	26.5 19	40.07 26	37.7 11
11.8	54.19 44	26.6 15	53.70 28	4.7 5	40.81 34	25.2 13	40.35 28	37.0 7
21.8	54.65 46	25.8 8	53.99 29	4.6 1	41.16 35	24.5 7	40.64 29	36.7 3
31.8	55.13 48	25.6 2	54.29 30	4.9 3	41.52 36	24.4 1	40.94 30	36.9 2
	48	5	30	6	36	6	31	6
Apr. 10.7	55.61	26.1	54.59	5.5	41.88	25.0	41.25	37.5
20.7	56.07 46	27.3 12	54.89 30	6.4 9	42.24 36	26.1 11	41.55 30	38.5 10
30.7	56.51 44	29.0 17	55.18 29	7.6 12	42.59 35	27.8 17	41.84 29	39.8 13
May 10.7	56.91 40	31.2 22	55.46 28	9.0 14	42.91 32	29.9 21	42.12 28	41.5 17
20.6	57.27 36	33.9 27	55.73 27	10.6 16	43.20 29	32.4 25	42.39 27	43.4 19
	30	30	25	17	26	29	24	21
30.6	57.57	36.9	55.98	12.3	43.46	35.3	42.63	45.5
June 9.6	57.81 24	40.2 33	56.19 21	14.0 17	43.68 22	38.4 31	42.85 22	47.7 22
19.5	57.98 17	43.6 34	56.37 18	15.8 18	43.85 17	41.6 32	43.03 18	50.0 23
29.5	58.08 10	47.1 35	56.52 15	17.5 17	43.97 12	44.9 33	43.17 14	52.3 23
July 9.5	58.10 2	50.6 35	56.63 11	19.1 16	44.04 7	48.1 32	43.27 10	54.5 22
	5	33	7	15	1	31	6	20
19.5	58.05	53.9	56.70	20.6	44.05	51.2	43.33	56.5
29.4	57.92 13	57.0 31	56.73 3	22.0 14	44.00 5	54.1 29	43.35 2	58.4 19
Aug. 8.4	57.73 19	59.9 29	56.71 2	23.2 12	43.90 10	56.8 27	43.32 3	60.1 17
18.4	57.47 26	62.5 26	56.65 6	24.2 10	43.76 14	59.1 23	43.25 7	61.6 15
28.4	57.15 32	64.7 22	56.56 9	25.0 8	43.57 19	61.1 20	43.15 10	62.8 12
	36	17	13	6	23	16	14	9
Sept. 7.3	56.79	66.4	56.43	25.6	43.34	62.7	43.01	63.7
17.3	56.39 40	67.7 13	56.28 15	26.0 4	43.08 26	63.9 12	42.85 16	64.3 6
27.3	55.97 42	68.5 8	56.12 16	26.2 2	42.81 27	64.6 7	42.68 17	64.7 4
Oct. 7.2	55.53 44	68.7 2	55.96 16	26.2 0	42.53 28	64.8 2	42.50 18	64.8 1
17.2	55.10 43	68.4 3	55.80 16	25.9 3	42.25 28	64.5 3	42.32 18	64.5 3
	41	8	15	5	26	8	16	6
27.2	54.69	67.6	55.65	25.4	41.99	63.7	42.16	63.9
Nov. 6.2	54.31 38	66.3 13	55.52 13	24.7 7	41.75 24	62.4 13	42.02 14	63.0 9
16.1	53.97 34	64.5 18	55.43 9	23.9 8	41.55 20	60.7 17	41.91 11	61.9 11
26.1	53.69 28	62.2 23	55.37 6	22.9 10	41.39 16	58.6 21	41.83 8	60.5 14
Dec. 6.1	53.47 22	59.4 28	55.35 2	21.7 12	41.28 11	56.1 25	41.80 3	58.8 17
	14	31	2	14	6	29	1	19
16.1	53.33	56.3	55.37	20.3	41.22	53.2	41.81	56.9
26.0	53.27 6	53.0 33	55.43 6	18.8 15	41.22 0	50.1 31	41.86 5	54.9 20
36.0	53.29 2	49.5 35	55.54 11	17.3 15	41.27 5	46.9 32	41.95 9	52.8 21
Sec δ, Tan δ	1.958	+1.682	1.003	+0.071	1.386	+0.960	1.035	+0.267
Mean Place	55°.178	54'' .32	53°.653	22'' .62	41°.284	51'' .59	40°.413	57'' .74
D'ψ a, Dω a	-0.04	-0.02	0.00	0.00	-0.02	-0.01	-0.01	0.00
Dψ δ, Dω δ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Lyrae. Mag. 3.3		ζ Sagittarii. Mag. 2.7		ζ Aquilae. Mag. 3.0		λ Aquilae. Mag. 3.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 18 55 s	° ' +32 33 "	h m 18 57 s	° ' -30 0 "	h m 19 1 s	° ' +13 43 "	h m 19 1 s	° ' - 5 0 "
Jan. 1.0	39.55	61.5	3.00	30.5	23.15	50.8	36.46	59.3
11.0	39.65 ¹⁰	58.6 ²⁹	3.16 ¹⁶	29.9 ⁶	23.26 ¹¹	48.8 ²⁰	36.59 ¹³	60.3 ¹⁰
21.0	39.79 ¹⁴	55.8 ²⁸	3.36 ²⁰	29.4 ⁵	23.41 ¹⁵	46.8 ²⁰	36.76 ¹⁷	61.2 ⁹
30.9	39.98 ¹⁹	53.1 ²⁷	3.60 ²⁴	28.9 ⁵	23.59 ¹⁸	44.9 ¹⁹	36.96 ²⁰	62.1 ⁹
Feb. 9.9	40.20 ²²	50.7 ²⁴	3.87 ²⁷	28.4 ⁵	23.81 ²²	43.2 ¹⁷	37.18 ²²	62.9 ⁸
	26	21	29	5	24	14	25	6
19.9	40.46 ²⁸	48.6 ¹⁶	4.16 ³²	27.9 ⁶	24.05 ²⁶	41.8 ¹¹	37.43 ²⁷	63.5 ⁴
Mar. 1.8	40.74 ³⁰	47.0 ¹¹	4.48 ³³	27.3 ⁵	24.31 ²⁸	40.7 ⁷	37.70 ²⁸	63.9 ²
11.8	41.04 ³²	45.9 ⁶	4.81 ³⁴	26.8 ⁵	24.59 ²⁹	40.0 ³	37.98 ²⁹	64.1 ¹
21.8	41.36 ³²	45.3 ⁰	5.15 ³⁵	26.3 ⁶	24.88 ²⁹	39.7 ²	38.27 ³⁰	64.0 ⁴
31.8	41.68 ³³	45.3 ⁵	5.50 ³⁶	25.7 ⁵	25.17 ³⁰	39.9 ⁶	38.57 ³¹	63.6 ⁶
Apr. 10.7	42.01 ³²	45.8 ¹¹	5.86 ³⁵	25.2 ⁵	25.47 ³¹	40.5 ¹⁰	38.88 ³¹	63.0 ⁸
20.7	42.33 ³¹	46.9 ¹⁶	6.21 ³⁵	24.7 ⁴	25.78 ³⁰	41.5 ¹³	39.19 ³⁰	62.2 ¹⁰
30.7	42.64 ³⁰	48.5 ²⁰	6.56 ³⁴	24.3 ⁴	26.08 ²⁸	42.8 ¹⁶	39.49 ²⁹	61.2 ¹²
May 10.7	42.94 ²⁸	50.5 ²⁴	6.90 ³²	23.9 ³	26.36 ²⁷	44.4 ¹⁹	39.78 ²⁸	60.0 ¹³
20.6	43.22 ²⁵	52.9 ²⁶	7.22 ³⁰	23.6 ²	26.63 ²⁵	46.3 ²¹	40.06 ²⁵	58.7 ¹³
30.6	43.47 ²¹	55.5 ²⁸	7.52 ²⁶	23.4 ¹	26.88 ²²	48.4 ²²	40.31 ²³	57.4 ¹⁴
June 9.6	43.68 ¹⁸	58.3 ²⁹	7.78 ²³	23.3 ¹	27.10 ¹⁸	50.6 ²²	40.54 ²⁰	56.0 ¹³
19.5	43.86 ¹³	61.2 ³⁰	8.01 ¹⁹	23.4 ²	27.28 ¹⁵	52.8 ²²	40.74 ¹⁷	54.7 ¹²
29.5	43.99 ⁸	64.2 ²⁹	8.20 ¹⁵	23.6 ³	27.43 ¹¹	55.0 ²²	40.91 ¹³	53.5 ¹²
July 9.5	44.07 ⁴	67.1 ²⁸	8.35 ¹⁰	23.9 ⁴	27.54 ⁶	57.2 ²⁰	41.04 ⁸	52.3 ¹¹
19.5	44.11 ¹	69.9 ²⁶	8.45 ⁵	24.3 ⁵	27.60 ²	59.2 ¹⁹	41.12 ⁴	51.2 ⁹
29.4	44.10 ⁶	72.5 ²³	8.50 ⁰	24.8 ⁵	27.62 ²	61.1 ¹⁷	41.16 ⁰	50.3 ⁷
Aug. 8.4	44.04 ¹¹	74.8 ²¹	8.50 ⁵	25.3 ⁶	27.60 ⁶	62.8 ¹⁴	41.16 ⁵	49.6 ⁶
18.4	43.93 ¹⁴	76.9 ¹⁸	8.45 ¹⁰	25.9 ⁶	27.54 ⁹	64.2 ¹²	41.11 ⁸	49.0 ⁵
28.4	43.79 ¹⁸	78.7 ¹⁴	8.35 ¹³	26.5 ⁵	27.45 ¹³	65.4 ⁹	41.03 ¹¹	48.5 ³
Sept. 7.3	43.61 ²⁰	80.1 ¹⁰	8.22 ¹⁶	27.0 ⁴	27.32 ¹⁵	66.3 ⁶	40.92 ¹⁴	48.2 ²
17.3	43.41 ²²	81.1 ⁶	8.06 ¹⁷	27.4 ³	27.17 ¹⁷	66.9 ⁴	40.78 ¹⁶	48.0 ¹
27.3	43.19 ²²	81.7 ²	7.89 ¹⁸	27.7 ²	27.00 ¹⁸	67.3 ¹	40.62 ¹⁶	47.9 ¹
Oct. 7.2	42.97 ²²	81.9 ³	7.71 ¹⁸	27.9 ¹	26.82 ¹⁸	67.4 ³	40.46 ¹⁶	48.0 ²
17.2	42.75 ²¹	81.6 ⁷	7.53 ¹⁷	28.0 ¹	26.64 ¹⁶	67.1 ⁵	40.30 ¹⁵	48.2 ³
27.2	42.54 ¹⁹	80.9 ¹¹	7.36 ¹⁴	27.9 ²	26.48 ¹⁴	66.6 ⁸	40.15 ¹²	48.5 ⁴
Nov. 6.2	42.35 ¹⁵	79.8 ¹⁶	7.22 ¹⁰	27.7 ⁴	26.34 ¹¹	65.8 ¹¹	40.03 ⁹	48.9 ⁶
16.1	42.20 ¹²	78.2 ¹⁹	7.12 ⁶	27.3 ⁴	26.23 ⁸	64.7 ¹⁴	39.94 ⁶	49.5 ⁷
26.1	42.08 ⁷	76.3 ²³	7.06 ²	26.9 ⁵	26.15 ⁴	63.3 ¹⁶	39.88 ²	50.2 ⁸
Dec. 6.1	42.01 ²	74.0 ²⁵	7.04 ⁴	26.4 ⁵	26.11 ⁰	61.7 ¹⁸	39.86 ²	51.0 ⁸
16.1	41.99 ²	71.5 ²⁷	7.08 ⁹	25.9 ⁶	26.11 ⁵	59.9 ¹⁹	39.88 ⁶	51.8 ⁹
26.0	42.01 ⁷	68.8 ²⁹	7.17 ¹³	25.3 ⁶	26.16 ⁹	58.0 ²⁰	39.94 ¹¹	52.7 ¹⁰
36.0	42.08	65.9	7.30	24.7	26.25	56.0	40.05	53.7
Sec δ, Tan δ	1.187	+0.639	1.155	-0.578	1.029	+0.244	1.004	-0.088
Mean Place	41°.324	70''.44	4°.612	19''.99	24°.670	60''.26	37°.916	49''.21
D'ψ a, Dω a	-0.02	-0.01	+0.01	+0.01	-0.01	0.00	0.00	0.00
Dψ δ, Dω δ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Coronæ Australis. Mag. 4.1		ϵ Lyræ. Mag. 5.1		π Sagittarii. Mag. 3.0		ψ Sagittarii. Mag. 4.9	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 19 3 s	° ' -38 2 "	h m 19 4 s	° ' +35 57 "	h m 19 4 s	° ' -21 9 "	h m 19 10 s	° ' -25 24 "
Jan. 1.0	31.49	38.8	10.00	39.1	33.93	56.4	10.87	37.9
11.0	31.66 17	37.7 11	10.08 8	36.1 30	34.07 14	56.4 0	11.01 14	37.6 3
21.0	31.87 21	36.6 11	10.21 13	33.2 29	34.25 18	56.3 1	11.19 18	37.3 3
30.9	32.12 25	35.6 10	10.39 18	30.4 28	34.47 22	56.3 0	11.41 22	37.0 3
Feb. 9.9	32.41 29 31	34.6 10 9	10.61 22 25	27.8 26 22	34.71 24 26	56.2 1 2	11.66 25 27	36.6 4 4
19.9	32.72	33.7	10.86	25.6	34.97	56.0	11.93	36.2
Mar. 1.9	33.06 34	32.8 9	11.14 28	23.9 17	35.26 29	55.8 2	12.22 29	35.7 5
11.8	33.42 36	32.0 8	11.44 30	22.7 12	35.57 31	55.5 3	12.53 31	35.2 5
21.8	33.79 37	31.3 7	11.76 32	22.0 7	35.89 32	55.0 5	12.86 33	34.6 6
31.8	34.17 38 39	30.7 6 6	12.10 34 34	21.9 1 5	36.21 32 33	54.5 5 6	13.19 33 34	34.0 6 6
Apr. 10.7	34.56	30.1	12.44	22.4	36.54	53.9	13.53	33.4
20.7	34.95 39	29.6 5	12.77 33	23.4 10	36.87 33	53.2 7	13.87 34	32.7 7
30.7	35.33 38	29.3 3	13.10 33	25.0 16	37.20 33	52.5 7	14.21 34	32.0 7
May 10.7	35.70 37	29.1 2	13.41 31	27.0 20	37.52 32	51.8 7	14.54 33	31.4 6
20.6	36.05 35 32	29.1 0 1	13.70 29 26	29.3 23 27	37.82 30 28	51.1 7 6	14.86 32 29	30.9 5 5
30.6	36.37	29.2	13.96	32.0	38.10	50.5	15.15	30.4
June 9.6	36.67 30	29.5 3	14.18 22	34.9 29	38.36 26	49.9 6	15.42 27	30.0 4
19.6	36.93 26	30.0 5	14.36 18	37.9 30	38.58 22	49.4 5	15.66 24	29.7 3
29.5	37.14 21	30.6 6	14.50 14	41.0 31	38.77 19	49.0 4	15.86 20	29.6 1
July 9.5	37.31 17 11	31.3 7 9	14.59 9 4	44.0 30 30	38.91 14 10	48.8 2 1	16.01 15 11	29.6 0 1
19.5	37.42	32.2	14.63	47.0	39.01	48.7	16.12	29.7
29.4	37.48 6	33.1 9	14.62 1	49.8 28	39.06 5	48.7 0	16.18 6	29.9 2
Aug. 8.4	37.48 0	34.1 10	14.56 6	52.3 25	39.07 1	48.8 1	16.19 1	30.2 3
18.4	37.43 5	35.1 10	14.45 11	54.5 22	39.03 4	48.9 1	16.15 4	30.6 4
28.4	37.33 10 14	36.0 9 8	14.30 15 18	56.4 19 16	38.95 8 12	49.1 2 3	16.07 8 12	31.0 4 4
Sept. 7.3	37.19	36.8	14.12	58.0	38.83	49.4	15.95	31.4
17.3	37.01 18	37.5 7	13.91 21	59.1 11	38.69 14	49.6 2	15.81 14	31.8 4
27.3	36.82 19	38.0 5	13.68 23	59.8 7	38.53 16	49.8 2	15.65 16	32.1 3
Oct. 7.3	36.62 20	38.2 2	13.44 24	60.1 3	38.36 17	50.0 2	15.47 18	32.3 2
17.2	36.42 20 19	38.2 0 1	13.20 24 22	60.0 1 6	38.19 17 15	50.2 2 1	15.30 17 16	32.5 2 1
27.2	36.23	38.1	12.98	59.4	38.04	50.3	15.14	32.6
Nov. 6.2	36.07 16	37.7 4	12.78 20	58.3 11	37.91 13	50.3 0	15.00 14	32.5 1
16.1	35.95 12	37.1 6	12.61 17	56.8 15	37.81 10	50.3 0	14.90 10	32.4 1
26.1	35.87 8	36.3 8	12.48 13	54.8 20	37.75 6	50.3 0	14.83 7	32.2 2
Dec. 6.1	35.84 3 3	35.4 9 10	12.39 9 4	52.5 23 25	37.73 2 3	50.3 0 1	14.81 2 2	31.9 3 3
16.1	35.87	34.4	12.35	50.0	37.76	50.2	14.83	31.6
26.0	35.95 8	33.4 10	12.35 0	47.2 28	37.83 7	50.1 1	14.90 7	31.3 3
36.0	36.09 14	32.3 11	12.40 5	44.3 29	37.95 12	50.1 0	15.01 11	31.0 3
Sec δ , Tan δ	1.270	-0.782	1.235	+0.725	1.072	-0.387	1.107	-0.475
Mean Place	33°.225	27''.86	11°.855	47''.40	35°.437	45''.81	12°.408	27''.04
D' ψ α , D ω α	+0.02	+0.01	-0.02	-0.01	+0.01	+0.01	+0.01	+0.01
D ψ δ , D ω δ	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0	+0.1	-1.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Draconis. Mag. 3.2		d Sagittarii. Mag. 5.0		θ Lyrae. Mag. 4.5		ω Aquilae. Mag. 5.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 19 12	° ' +67 30	h m 19 12	° ' -19 6	h m 19 13	° ' +37 58	h m 19 13	° ' +11 25
	s	"	s	"	s	"	s	"
Jan. 1.0	28.38	24.4	31.24	41.5	18.95	34.2	42.47	66.9
11.0	28.36 2	20.9 35	31.37 13	41.6 1	19.02 7	31.2 30	42.57 10	65.0 19
21.0	28.45 9	17.4 35	31.54 17	41.7 1	19.14 12	28.2 30	42.71 14	63.2 18
30.9	28.65 20	14.0 34	31.74 20	41.7 0	19.30 16	25.4 28	42.88 17	61.4 18
Feb. 9.9	28.95 30	10.9 31	31.97 23	41.6 1	19.51 21	22.8 26	43.09 21	59.8 16
	39	28	26	1	25	23	23	13
19.9	29.34	8.1	32.23	41.5	19.76	20.5	43.32	58.5
Mar. 1.9	29.80 46	5.8 23	32.51 28	41.3 2	20.04 28	18.6 19	43.57 25	57.5 10
11.8	30.33 53	4.0 18	32.80 29	41.0 3	20.34 30	17.3 13	43.84 27	56.9 6
21.8	30.91 58	2.9 11	33.11 31	40.6 4	20.66 32	16.5 8	44.12 28	56.6 3
31.8	31.51 60	2.5 4	33.43 32	40.0 6	21.00 34	16.3 2	44.42 30	56.8 2
	61	2	32	7	35	4	30	6
Apr. 10.7	32.12	2.7 8	33.75	39.3	21.35	16.7	44.72	57.4
20.7	32.72 60	3.5 8	34.08 33	38.6 7	21.69 34	17.7 10	45.02 30	58.3 9
30.7	33.29 57	4.9 14	34.41 33	37.8 8	22.02 33	19.2 15	45.32 30	59.6 13
May 10.7	33.82 53	6.9 20	34.73 32	36.9 9	22.34 32	21.2 20	45.61 29	61.2 16
20.6	34.30 48	9.4 25	35.03 30	36.1 8	22.64 30	23.6 24	45.89 28	63.0 18
	41	29	28	8	27	27	26	20
30.6	34.71	12.3	35.31	35.3	22.91	26.3	46.15	65.0
June 9.6	35.03 32	15.5 32	35.57 26	34.6 7	23.14 23	29.2 29	46.38 23	67.1 21
19.6	35.26 23	18.9 34	35.80 23	34.0 6	23.33 19	32.3 31	46.58 20	69.3 22
29.5	35.40 14	22.4 35	35.99 19	33.5 5	23.48 15	35.4 31	46.74 16	71.4 21
July 9.5	35.44 4	26.0 36	36.14 15	33.1 4	23.58 10	38.5 31	46.86 12	73.5 21
	6	35	10	3	5	30	8	20
19.5	35.38	29.5	36.24	32.8	23.63	41.5	46.94	75.5
29.4	35.22 16	32.8 33	36.30 6	32.7 1	23.62 1	44.4 29	46.98 4	77.3 18
Aug. 8.4	34.97 25	35.9 31	36.31 1	32.7 0	23.56 6	47.1 27	46.97 1	78.9 16
18.4	34.63 34	38.8 29	36.28 3	32.7 0	23.46 10	49.5 24	46.92 5	80.3 14
28.4	34.22 41	41.3 25	36.21 7	32.7 1	23.31 15	51.5 20	46.83 9	81.5 12
	48	21	11	2	18	17	12	9
Sept. 7.3	33.74	43.4	36.10	33.0	23.13	53.2	46.71	82.4
17.3	33.20 54	45.1 17	35.96 14	33.2 2	22.92 21	54.5 13	46.57 14	83.0 6
27.3	32.62 58	46.3 12	35.80 16	33.2 2	22.69 23	55.3 8	46.41 16	83.4 4
Oct. 7.3	32.02 60	47.0 7	35.63 17	33.4 2	22.44 25	55.7 4	46.23 18	83.5 1
17.2	31.42 60	47.1 1	35.47 16	33.6 2	22.19 25	55.6 1	46.06 17	83.3 2
	59	4	15	2	23	5	16	4
27.2	30.83	46.7	35.32	34.0	21.96	55.1	45.90	82.9
Nov. 6.2	30.27 56	45.7 10	35.19 13	34.1 1	21.75 21	54.1 10	45.76 14	82.2 7
16.1	29.76 51	44.2 15	35.09 10	34.1 1	21.57 18	52.7 14	45.64 12	81.2 10
26.1	29.31 45	42.2 20	35.02 7	34.2 1	21.42 15	50.8 19	45.56 8	80.0 12
Dec. 6.1	28.94 37	39.7 25	34.99 3	34.3 0	21.31 11	48.5 23	45.52 4	78.6 14
	29	29	2	1	6	25	0	16
16.1	28.65	36.8	35.01	34.4	21.25	46.0	45.52	77.0
26.0	28.46 19	33.6 32	35.07 6	34.4 0	21.24 1	43.2 28	45.56 4	75.2 18
36.0	28.38 8	30.2 34	35.18 11	34.4 1	21.28 4	40.2 30	45.64 8	73.3 19
				34.5				
Sec δ , Tan δ	2.614	+2.415	1.059	-0.346	1.268	+0.781	1.020	+0.202
Mean Place	32°.325	30'' .54	32°.714	30'' .81	20°.864	41'' .91	43°.972	76'' .05
D' ψ a , D ω a	-0.06	-0.05	+0.01	+0.01	-0.02	-0.02	-0.01	0.00
D ψ δ , D ω δ	+0.1	-1.0	+0.1	-1.0	+0.1	-0.9	+0.1	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	κ Cygni. Mag. 4.0		τ Draconis. Mag. 4.6		δ Aquilæ. Mag. 3.4		β Cygni. Mag. 3.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 19 15 s	° ' +53 11 "	h m 19 17 s	° ' +73 11 "	h m 19 21 s	° ' + 2 56 "	h m 19 27 s	° ' +27 46 "
Jan. 1.0	3.04	80.6	8.85	33.9	5.27	16.5	11.05	27.1
11.0	3.08 4	77.2 34	8.77 8	30.5 34	5.37 10	15.1 14	11.13 8	24.5 26
21.0	3.19 11	73.8 34	8.83 6	27.0 35	5.51 14	13.8 13	11.24 11	21.9 26
30.9	3.36 17	70.6 32	9.04 21	23.6 34	5.68 17	12.5 13	11.39 15	19.4 25
Feb. 9.9	3.59 23	67.6 30	9.39 35	20.4 32	5.88 20	11.4 11	11.58 19	17.1 23
	28	27	47	28	23	9	22	20
19.9	3.87	64.9	9.86	17.6	6.11	10.5	11.80	15.1
Mar. 1.9	4.20 33	62.7 22	10.43 57	15.2 24	6.36 25	9.8 7	12.05 25	13.5 16
11.8	4.57 37	61.1 16	11.09 66	13.4 18	6.63 27	9.4 4	12.33 28	12.4 11
21.8	4.96 39	60.1 10	11.81 72	12.2 12	6.91 28	9.4 0	12.62 29	11.8 6
31.8	5.37 41	59.8 3	12.58 77	11.6 6	7.20 29	9.7 3	12.93 31	11.7 1
	42	3	78	1	30	6	32	4
Apr. 10.8	5.79	60.1	13.36	11.7	7.50	10.3	13.25	12.1
20.7	6.21 42	61.0 9	14.13 77	12.5 8	7.81 31	11.2 9	13.57 32	13.0 9
30.7	6.62 41	62.5 15	14.86 73	13.9 14	8.11 30	12.4 12	13.88 31	14.4 14
May 10.7	7.00 38	64.5 20	15.54 68	15.8 19	8.41 30	13.8 14	14.19 31	16.2 18
20.6	7.35 35	67.0 25	16.14 60	18.2 24	8.70 29	15.4 16	14.48 29	18.3 21
	31	29	51	28	26	17	27	24
30.6	7.66	69.9	16.65	21.0	8.96	17.1	14.75	20.7
June 9.6	7.92 26	73.0 31	17.05 40	24.1 31	9.20 24	18.9 18	14.99 24	23.4 27
19.6	8.13 21	76.3 33	17.33 28	27.5 34	9.41 21	20.7 18	15.20 21	26.2 28
29.5	8.27 14	79.8 35	17.48 15	31.0 35	9.58 17	22.4 17	15.37 17	29.0 28
July 9.5	8.35 8	83.3 35	17.50 2	34.5 35	9.72 14	24.1 17	15.49 12	31.8 28
	1	34	11	35	9	16	7	28
19.5	8.36	86.7	17.39	38.0	9.81	25.7	15.56	34.6
29.5	8.31 5	89.9 32	17.16 23	41.4 34	9.86 5	27.1 14	15.59 3	37.2 26
Aug. 8.4	8.20 11	92.9 30	16.81 35	44.6 32	9.87 1	28.3 12	15.57 2	39.6 24
18.4	8.03 17	95.6 27	16.34 47	47.5 29	9.84 3	29.4 11	15.51 6	41.7 21
28.4	7.80 23	98.0 24	15.77 57	50.1 26	9.77 7	30.2 8	15.41 10	43.5 18
	27	20	66	22	11	6	14	15
Sept. 7.3	7.53	100.0	15.11	52.3	9.66	30.8	15.27	45.0
17.3	7.22 31	101.5 15	14.38 73	54.0 17	9.52 14	31.2 4	15.10 17	46.2 12
27.3	6.88 34	102.6 11	13.60 78	55.3 13	9.37 15	31.5 3	14.91 19	47.0 8
Oct. 7.3	6.53 35	103.2 6	12.79 81	56.1 8	9.21 16	31.6 1	14.71 20	47.4 4
17.2	6.18 35	103.3 1	11.97 82	56.3 2	9.05 16	31.4 2	14.50 21	47.4 0
	34	5	81	3	15	4	20	4
27.2	5.84	102.8	11.16	56.0	8.90	31.0	14.30	47.0
Nov. 6.2	5.52 32	101.8 10	10.38 78	55.2 8	8.77 13	30.4 6	14.12 18	46.2 8
16.2	5.23 29	100.3 15	9.66 72	53.8 14	8.66 11	29.7 7	13.97 15	45.0 12
26.1	4.99 24	98.3 20	9.01 65	51.9 19	8.58 8	28.8 9	13.85 12	43.5 15
Dec. 6.1	4.80 19	95.9 24	8.46 55	49.5 24	8.54 4	27.8 10	13.77 8	41.6 19
	13	28	43	28	0	12	5	22
16.1	4.67	93.1	8.03	46.7	8.54	26.6	13.72	39.4
26.0	4.60 7	90.0 31	7.72 31	43.6 31	8.58 4	25.3 13	13.72 0	37.0 24
36.0	4.60 0	86.7 33	7.55 17	40.2 34	8.66 8	23.9 14	13.76 4	34.5 25
Sec δ, Tan δ	1.670	+1.337	3.458	+3.310	1.001	+0.051	1.130	+0.527
Mean Place	5°.579	87''.20	14°.079	39''.43	6°.719	26''.06	12°.750	34''.64
D' + α, D _∞ α	-0.03	-0.03	-0.08	-0.07	0.00	0.00	-0.01	-0.01
D' + δ, D _∞ δ	+0.1	-0.9	+0.1	-0.9	+0.1	-0.9	+0.1	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Cygni. Mag. 3.9		μ Aquilæ. Mag. 4.6		h Sagittarii. Mag. 4.7		κ Aquilæ. Mag. 5.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 19 27	° ' " +51 32	h m 19 29	° ' " + 7 11	h m 19 31	° ' " -25 4	h m 19 32	° ' " - 7 13
Jan. 1.0	28.32	32.8	48.93	28.0	23.36	46.7	11.31	27.8
11.0	28.35 3	29.4 34	49.02 9	26.4 16	23.48 12	46.4 3	11.41 10	28.6 8
21.0	28.44 9	26.1 33	49.15 13	24.8 16	23.64 16	46.0 4	11.55 14	29.3 7
31.0	28.59 15	22.9 32	49.31 16	23.3 15	23.83 19	45.6 4	11.72 17	29.9 6
Feb. 9.9	28.80 21	19.9 30	49.50 19	22.0 13	24.05 22	45.1 5	11.92 20	30.4 5
	26	27	22	11	25	5	22	4
19.9	29.06	17.2	49.72	20.9	24.30	44.6	12.14	30.8
Mar. 1.9	29.36 30	15.0 22	49.96 24	20.0 9	24.58 28	44.0 6	12.39 25	31.0 2
11.8	29.70 34	13.3 17	50.22 26	19.5 5	24.88 30	43.3 7	12.66 27	31.0 0
21.8	30.08 38	12.2 11	50.50 28	19.4 1	25.20 32	42.6 7	12.94 28	30.8 2
31.8	30.48 40	11.7 5	50.79 29	19.6 2	25.53 33	41.8 8	13.24 30	30.3 5
	41	2	30	6	33	8	31	7
Apr. 10.8	30.89	11.9	51.09	20.2	25.86	41.0	13.55	29.6
20.7	31.30 41	12.7 8	51.39 30	21.1 9	26.20 34	40.1 9	13.86 31	28.6 10
30.7	31.70 40	14.1 14	51.69 30	22.3 12	26.54 34	39.3 8	14.17 31	27.5 11
May 10.7	32.08 38	16.0 19	51.99 30	23.8 15	26.88 34	38.5 8	14.47 30	26.3 12
20.7	32.43 35	18.4 24	52.28 29	25.5 17	27.21 33	37.8 7	14.77 30	25.0 13
	32	28	27	19	31	7	28	14
30.6	32.75	21.2	52.55	27.4	27.52	37.1	15.05	23.6
June 9.6	33.02 27	24.3 31	52.79 24	29.4 20	27.80 28	36.6 5	15.30 25	22.2 14
19.6	33.24 22	27.6 33	53.00 21	31.4 20	28.05 25	36.2 4	15.53 23	20.9 13
29.5	33.41 17	31.0 34	53.18 18	33.4 20	28.27 22	35.9 3	15.72 19	19.7 12
July 9.5	33.51 10	34.5 35	53.32 14	35.3 19	28.44 17	35.8 1	15.88 16	18.5 12
	4	34	10	18	13	0	11	10
19.5	33.55	37.9	53.42	37.1	28.57	35.8	15.99	17.5
29.5	33.52 3	41.2 33	53.48 6	38.7 16	28.65 8	36.0 2	16.06 7	16.6 9
Aug. 8.4	33.43 9	44.3 31	53.49 1	40.2 15	28.68 3	36.3 3	16.08 2	15.9 7
18.4	33.29 14	47.1 28	53.46 3	41.5 13	28.66 2	36.6 3	16.06 2	15.4 5
28.4	33.09 20	49.6 25	53.39 7	42.5 10	28.60 6	37.0 4	16.00 6	15.0 4
	25	21	10	8	10	5	9	3
Sept. 7.4	32.84	51.7	53.29	43.3	28.50	37.5	15.91	14.7
17.3	32.56 28	53.4 17	53.16 13	43.9 6	28.37 13	38.0 5	15.79 12	14.5 2
27.3	32.25 31	54.6 12	53.01 15	44.2 3	28.21 16	38.4 4	15.65 14	14.5 0
Oct. 7.3	31.52 33	55.3 7	52.85 16	44.3 1	28.04 17	38.7 3	15.49 16	14.6 1
17.2	31.59 33	55.5 2	52.68 17	44.2 1	27.87 17	38.9 2	15.33 16	14.8 2
	33	3	16	3	16	1	15	3
27.2	31.26	55.2	52.52	43.9	27.71	39.0	15.18	15.1
Nov. 6.2	30.95 31	54.4 8	52.38 14	43.3 6	27.57 14	39.1 1	15.05 13	15.5 4
16.2	30.67 28	53.0 14	52.26 12	42.5 8	27.45 12	39.1 0	14.94 11	16.0 5
26.1	30.43 24	51.2 18	52.18 8	41.5 10	27.37 8	39.0 1	14.86 8	16.5 5
Dec. 6.1	30.24 19	48.9 23	52.13 5	40.3 12	27.33 4	38.8 2	14.82 4	17.1 6
	13	27	1	14	0	3	1	7
16.1	30.11	46.2	52.12	38.9	27.33	38.5	14.81	17.8
26.1	30.03 8	43.2 30	52.15 3	37.4 15	27.37 4	38.2 3	14.85 4	18.5 7
36.0	30.01 2	40.0 32	52.22 7	35.8 16	27.46 9	37.8 4	14.93 8	19.2 7
Sec δ, Tan δ	1.608	+1.259	1.008	+0.126	1.104	-0.468	1.008	-0.127
Mean Place	30°.783	38''.51	50°.389	37''.02	24°.847	35''.26	12°.723	17''.58
D'ψ α, Dω α	-0.03	-0.03	0.00	0.00	+0.01	+0.01	0.00	0.00
Dψ δ, Dω δ	+0.1	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>f</i> Sagittarii. Mag. 5.1		<i>γ</i> Aquilæ. Mag. 2.8		<i>δ</i> Cygni. Mag. 3.0		<i>δ</i> Sagittæ. Mag. 3.8	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 19 41	° ' -19 58	h m 19 42	° ' +10 23	h m 19 42	° ' +44 54	h m 19 43	° ' +18 18
	s	"	s	"	s	"	s	"
Jan. 1.0	15.87	26.8	5.94	53.4	13.24	59.3	28.96	60.9
11.0	15.97 10	26.8 0	6.01 7	51.7 17	13.26 2	56.2 31	29.03 7	58.8 21
21.0	16.11 14	26.7 1	6.12 11	50.0 17	13.33 7	53.1 31	29.14 11	56.7 21
31.0	16.28 17	26.5 2	6.27 15	48.4 16	13.46 13	50.0 31	29.28 14	54.6 21
Feb. 9.9	16.49 21	26.3 2	6.45 18	46.9 15	13.64 18	47.1 29	29.45 17	52.7 19
	23	3	21	13	23	25	20	16
19.9	16.72	26.0	6.66	45.6	13.87	44.6	29.65	51.1
Mar. 1.9	16.98 26	25.6 4	6.89 23	44.7 9	14.14 27	42.4 22	29.88 23	49.9 12
11.9	17.26 28	25.1 5	7.14 25	44.1 6	14.44 30	40.7 17	30.14 26	49.0 9
21.8	17.56 30	24.4 7	7.41 27	43.9 2	14.77 33	39.6 11	30.42 28	48.5 5
31.8	17.87 31	23.6 8	7.70 29	44.0 1	15.12 35	39.1 5	30.71 29	48.5 0
	32	9	30	5	37	1	30	5
Apr. 10.8	18.19	22.7	8.00	44.5	15.49	39.2	31.01	49.0
20.7	18.52 33	21.8 9	8.30 30	45.4 9	15.87 38	39.9 7	31.32 31	49.9 9
30.7	18.85 33	20.8 10	8.61 31	46.7 13	16.24 37	41.2 13	31.63 31	51.2 13
May 10.7	19.18 33	19.8 10	8.91 30	48.3 16	16.60 36	43.0 18	31.93 30	52.8 16
20.7	19.50 32	18.8 10	9.20 29	50.1 18	16.94 34	45.3 23	32.22 29	54.7 19
	30	9	28	20	31	26	28	22
30.6	19.80	17.9	9.48	52.1	17.25	47.9	32.50	56.9
June 9.6	20.08 28	17.1 8	9.73 25	54.2 21	17.52 27	50.9 30	32.75 25	59.3 24
19.6	20.33 25	16.4 7	9.95 22	56.3 21	17.75 23	54.1 32	32.97 22	61.8 25
29.6	20.55 22	15.8 6	10.14 19	58.5 22	17.93 18	57.4 33	33.16 19	64.3 25
July 9.5	20.73 18	15.3 5	10.29 15	60.6 21	18.06 13	60.7 33	33.31 15	66.7 24
	13	3	11	20	7	33	10	24
19.5	20.86	15.0	10.40	62.6	18.13	64.0	33.41	69.1
29.5	20.94 8	14.9 1	10.46 6	64.4 18	18.14 1	67.2 32	33.46 5	71.4 23
Aug. 8.4	20.98 4	14.9 0	10.48 2	66.1 17	18.10 4	70.2 30	33.47 1	73.5 21
18.4	20.97 1	15.0 1	10.45 3	67.6 15	18.01 9	73 0 28	33.44 3	75.3 18
28.4	20.92 5	15.2 2	10.39 6	68.8 12	17.87 14	75.5 25	33.37 7	76.9 16
	9	2	10	10	19	21	11	13
Sept. 7.4	20.83	15.4	10.29	69.8	17.68	77.6	33.26	78.2
17.3	20.71 12	15.7 3	10.16 13	70.6 8	17.45 23	79.3 17	33.12 14	79.2 10
27.3	20.56 15	16.0 3	10.01 15	71.1 5	17 20 25	80.6 13	32.96 16	79.9 7
Oct. 7.3	20.40 16	16.3 3	9.85 16	71.3 2	16.93 27	81.4 8	32.79 17	80.3 4
17.3	20.24 16	16.6 3	9.68 17	71.2 1	16.65 28	81.8 4	32.61 18	80.3 0
	16	3	16	3	28	1	17	3
27.2	20.08	16.9	9.52	70.9	16.37	81.7	32.44	80.0
Nov. 6.2	19.94 14	17.1 2	9.37 15	70.4 5	16.11 26	81.0 7	32.28 16	79.4 6
16.2	19.82 12	17.2 1	9.25 12	69.6 8	15.88 23	79.8 12	32.14 14	78.5 9
26.1	19.74 8	17.3 1	9.16 9	68.5 11	15.68 20	78.2 16	32.03 11	77.2 13
Dec. 6.1	19.69 5	17.3 0	9.10 6	67.2 13	15.52 16	76.1 21	31.96 7	75.7 15
	1	0	3	14	12	25	4	17
16.1	19.68	17.3	9.07	65.8	15.40	73.6	31.92	74.0
26.1	19.71 3	17.3 0	9.08 1	64.2 16	15.33 7	70.9 27	31.92 0	72.1 19
36.0	19.79 8	17.2 1	9.13 5	62.5 17	15.32 1	67.9 30	31.96 4	70.0 21
Sec <i>δ</i> , Tan <i>δ</i>	1.064	-0.363	1.017	+0.183	1 412	+0.997	1.053	+0.331
Mean Place	17°.289	15''.54	7°.410	61''.91	15°.393	64''.44	30°.515	68''.53
D' <i>ψ</i> <i>α</i> , D _∞ <i>α</i>	+0.01	+0.01	0.00	-0.01	-0.02	-0.03	-0.01	-0.01
D _ψ <i>δ</i> , D _∞ <i>δ</i>	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Aquilæ. Mag. 0.9		η Aquilæ. Var. 3.7-4.4		ϵ Draconis. Mag. 4.0		ι Sagittarii. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 19 46	° ' + 8 37	h m 19 48	° ' + 0 46	h m 19 48	° ' +70 2	h m 19 49	° ' -42 5
	s	"	s	"	s	"	s	"
Jan. 1.0	30.86	67.6	1.08	44.6	23.98	44.0	13.99	64.8
11.0	30.93 7	66.0 16	1.16 8	43.4 12	23.85 13	40.7 33	14.10 11	63.4 14
21.0	31.04 11	64.4 16	1.28 12	42.3 11	23.84 1	37.3 34	14.26 16	61.9 15
31.0	31.19 15	62.9 15	1.43 15	41.2 11	23.95 11	33.9 34	14.46 20	60.4 15
Feb. 9.9	31.37 18	61.5 14	1.61 18	40.2 10	24.18 23	30.6 33	14.71 25	58.8 16
	20	12	20	7	34	30	28	15
19.9	31.57	60.3	1.81	39.5	24.52	27.6	14.99	57.3
Mar. 1.9	31.80 23	59.4 9	2.04 23	39.0 5	24.96 44	25.0 26	15.30 31	55.9 14
11.9	32.05 25	58.9 5	2.29 25	38.8 2	25.48 52	22.9 21	15.64 34	54.5 14
21.8	32.32 27	58.8 1	2.56 27	38.8 0	26.07 59	21.3 16	16.00 36	53.2 13
31.8	32.61 29	59.0 2	2.85 29	39.1 3	26.71 64	20.4 9	16.39 39	52.0 12
	30	6	30	7	67	3	40	11
Apr. 10.8	32.91	59.6	3.15	39.8	27.38	20.1	16.79	50.9
20.7	33.21 30	60.5 9	3.45 30	40.8 10	28.05 67	20.5 4	17.19 40	49.9 10
30.7	33.52 31	61.7 12	3.76 31	42.0 12	28.71 66	21.5 10	17.60 41	49.1 8
May 10.7	33.82 30	63.2 15	4.06 30	43.4 14	29.34 63	23.1 16	18.01 41	48.5 6
20.7	34.11 29	65.0 18	4.36 30	45.0 16	29.92 58	25.2 21	18.41 40	48.2 3
	28	20	28	17	51	26	37	1
30.6	34.39	67.0	4.64	46.7	30.43	27.8	18.78	48.1
June 9.6	34.65 26	69.1 21	4.90 26	48.4 17	30.86 43	30.8 30	19.13 35	48.2 1
19.6	34.88 23	71.2 21	5.13 23	50.2 18	31.20 34	34.1 33	19.45 32	48.5 3
29.6	35.07 19	73.3 21	5.33 20	51.9 17	31.44 24	37.6 35	19.72 27	49.1 6
July 9.5	35.23 16	75.3 20	5.49 16	53.5 16	31.57 13	41.2 36	19.94 22	49.9 8
	11	19	12	15	2	36	17	9
19.5	35.34	77.2	5.61	55.0	31.59	44.8	20.11	50.8
29.5	35.41 7	79.0 18	5.69 8	56.4 14	31.49 10	48.3 35	20.22 11	51.9 11
Aug. 8.4	35.44 3	80.6 16	5.73 4	57.6 12	31.29 20	51.7 34	20.27 5	53.1 12
18.4	35.42 2	82.0 14	5.72 1	58.6 10	30.99 30	54.9 32	20.26 1	54.4 13
28.4	35.36 6	83.2 12	5.67 5	59.5 9	30.59 40	57.8 29	20.20 6	55.6 12
	9	10	9	6	48	26	11	12
Sept. 7.4	35.27	84.2	5.58	60.1	30.11	60.4	20.09	56.8
17.3	35.15 12	84.9 7	5.46 12	60.5 4	29.56 55	62.6 22	19.94 15	57.9 11
27.3	35.00 15	85.4 5	5.32 14	60.7 2	28.95 61	64.3 17	19.75 19	58.8 9
Oct. 7.3	34.84 16	85.6 2	5.17 15	60.8 1	28.30 65	65.6 13	19.54 21	59.4 6
17.3	34.68 16	85.5 1	5.01 16	60.7 1	27.64 66	66.3 7	19.32 22	59.8 4
	16	3	15	3	67	2	21	1
27.2	34.52	85.2	4.86	60.4	26.97	66.5	19.11	59.9
Nov. 6.2	34.37 15	84.7 5	4.72 14	59.9 5	26.31 66	66.1 4	18.92 19	59.7 2
16.2	34.25 12	84.0 7	4.60 12	59.3 6	25.69 62	65.1 10	18.76 16	59.3 4
26.1	34.16 9	83.0 10	4.51 9	58.5 8	25.13 56	63.6 15	18.64 12	58.6 7
Dec. 6.1	34.10 6	81.8 12	4.46 5	57.6 9	24.64 49	61.6 20	18.56 8	57.7 9
	3	13	2	10	41	25	3	11
16.1	34.07	80.5	4.44	56.6	24.23	59.1	18.53	56.6
26.1	34.08 1	79.0 15	4.46 2	55.5 11	23.92 31	56.2 29	18.55 2	55.3 13
36.0	34.13 5	77.4 16	4.51 5	54.4 11	23.72 20	53.0 32	18.63 8	53.9 14
Sec δ , Tan δ	1.011	+0.152	1.000	+0.014	2.930	+2.754	1.347	-0.903
Mean Place	32°.315	76''.10	2°.492	53''.93	28°.501	46''.74	15°.639	51''.71
$D'\delta$, D_ω α	0.00	0.00	0.00	0.00	-0.07	-0.08	+0.02	+0.03
$D\delta$, D_ω δ	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ϵ Pavonis. Mag. 4.1		β Aquilæ. Mag. 3.9		γ Sagittæ. Mag. 3.7		ζ Sagittarij. Mag. 4.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 19 50	° ' -73 8	h m 19 51	° ' + 6 11	h m 19 54	° ' +19 14	h m 19 57	° ' -27 57
Jan. 1.0	28.93	42.7	0.96	10.9	51.72	71.7	17.21	21.3
11.0	29.07 14	39.7 30	1.03 7	9.5 14	51.77 5	69.6 21	17.30 9	20.7 6
21.0	29.34 27	36.6 31	1.14 11	8.0 15	51.86 9	67.5 21	17.43 13	20.0 7
31.0	29.74 40	33.6 30	1.28 14	6.6 14	51.99 13	65.4 21	17.60 17	19.3 7
Feb. 9.9	30.26 52	30.7 29	1.45 17	5.3 13	52.15 16	63.5 19	17.80 20	18.5 8
	63	27	20	10	19	16	23	8
19.9	30.89	28.0	1.65	4.3	52.34	61.9	18.03	17.7
Mar. 1.9	31.61 72	25.5 25	1.87 22	3.5 8	52.56 22	60.6 13	18.29 26	16.8 9
11.9	32.40 79	23.3 22	2.12 25	3.0 5	52.81 25	59.6 10	18.58 29	15.9 9
21.8	33.25 85	21.4 19	2.39 27	2.9 1	53.08 27	59.1 5	18.89 31	14.9 10
31.8	34.15 90	19.9 15	2.67 28	3.2 3	53.37 29	59.0 1	19.21 32	13.8 11
	93	12	30	6	30	4	34	11
Apr. 10.8	35.08	18.7	2.97	3.8	53.67	59.4	19.55	12.7
20.7	36.03 95	18.0 7	3.27 30	4.7 9	53.98 31	60.3 9	19.90 35	11.7 10
30.7	36.97 94	17.7 3	3.58 31	5.9 12	54.30 32	61.6 13	20.25 35	10.7 10
May 10.7	37.90 93	17.8 1	3.88 30	7.4 15	54.61 31	63.2 16	20.60 35	9.7 10
20.7	38.79 89	18.3 5	4.18 30	9.1 17	54.91 30	65.1 19	20.94 34	8.8 9
	83	9	28	19	28	22	33	7
30.6	39.62	19.2	4.46	11.0	55.19	67.3	21.27	8.1
June 9.6	40.38 76	20.5 13	4.72 26	12.9 19	55.45 26	69.7 24	21.58 31	7.5 6
19.6	41.05 67	22.2 17	4.95 23	14.9 20	55.68 23	72.2 25	21.86 28	7.1 4
29.6	41.61 56	24.2 20	5.15 20	16.9 20	55.87 19	74.8 26	22.10 24	6.9 2
July 9.5	42.05 44	26.5 23	5.31 16	18.8 19	56.03 16	77.3 25	22.30 20	6.9 0
	31	24	12	18	11	25	16	1
19.5	42.36	28.9	5.43	20.6	56.14	79.8	22.46	7.0
29.5	42.53 17	31.4 25	5.50 7	22.2 16	56.21 7	82.1 23	22.57 11	7.3 3
Aug. 8.4	42.56 3	34.0 26	5.53 3	23.7 15	56.23 2	84.2 21	22.62 5	7.7 4
18.4	42.45 11	36.5 25	5.52 1	25.0 13	56.21 2	86.1 19	22.63 1	8.2 5
28.4	42.20 25	38.8 23	5.47 5	26.1 11	56.14 7	87.8 17	22.59 4	8.8 6
	37	21	9	8	10	14	8	6
Sept. 7.4	41.83	40.9	5.38	26.9	56.04	89.2	22.51	9.4
17.3	41.36 47	42.7 18	5.26 12	27.5 6	55.91 13	90.3 11	22.39 12	10.0 6
27.3	40.81 55	44.1 14	5.12 14	27.9 4	55.75 16	91.1 8	22.24 15	10.6 6
Oct. 7.3	40.20 61	45.0 9	4.97 15	28.1 2	55.58 17	91.6 5	22.07 17	11.1 5
17.3	39.56 64	45.4 4	4.81 16	28.0 1	55.40 18	91.7 1	21.90 17	11.5 4
	63	2	16	3	18	2	17	3
27.2	38.93	45.2	4.65	27.7	55.22	91.5	21.73	11.8
Nov. 6.2	38.33 60	44.5 7	4.50 15	27.2 5	55.06 16	91.0 5	21.57 16	11.9 1
16.2	37.79 54	43.3 12	4.38 12	26.5 7	54.92 14	90.1 9	21.44 13	11.9 0
26.1	37.33 46	41.6 17	4.29 9	25.6 9	54.81 11	88.9 12	21.34 10	11.8 1
Dec. 6.1	36.98 35	39.5 21	4.23 6	24.5 11	54.72 9	87.5 14	21.28 6	11.5 3
	22	25	3	13	5	17	2	4
16.1	36.76	37.0	4.20	23.2	54.67	85.8	21.26	11.1
26.1	36.68 8	34.2 28	4.21 1	21.8 14	54.66 1	83.9 19	21.28 2	10.6 5
36.0	36.73 5	31.2 30	4.26 5	20.4 14	54.69 3	81.8 21	21.34 6	10.0 6
Sec δ , Tan δ	3.448	-3.300	1.006	+0.108	1.059	+0.349	1.132	-0.531
Mean Place	32 ^h .758	28'''.45	2 ^h .388	19'''.63	53 ^h .262	78'''.79	18 ^h .635	9'''.01
D' ψ α , D ω α	+0.08	+0.10	0.00	0.00	-0.01	-0.01	+0.01	+0.02
D ψ δ , D ω δ	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9	+0.2	-0.9

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	τ Aquilæ. Mag. 5.6			θ Aquilæ. Mag. 3.4			\circ Cygni seq. Mag. 4.0			κ Cephei. Mag. 4.4		
	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination N.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	19	59	+ 7 1	20	6	- 1 4	20	10	+46 28	20	11	+77 26
	s		"	s		"	s		"	s		"
Jan. 1.1	51.99		46.8	47.63		57.9	51.36		34.5	43.31		59.4
		6			6			2			38	
11.0	52.05	10	45.3 15	47.69	10	58.9 10	51.34	30	31.5	42.93	19	56.3 31
21.0	52.15	13	43.8 15	47.79	13	59.9 10	51.38	4	28.4 31	42.74	1	53.0 33
31.0	52.28	17	42.4 14	47.92	16	60.8 9	51.47	9	25.3 31	42.75	20	49.6 34
Feb. 10.0	52.45	19	41.2 12	48.08	19	61.6 8	51.61	14	22.4 29	42.95	38	46.3 33
			10			6		19	27			31
19.9	52.64		40.2	48.27		62.2	51.80		19.7	43.33		43.2
Mar. 1.9	52.86	22	39.4 8	48.49	22	62.6 4	52.04	24	17.4 23	43.88	55	40.4 28
		24			24	1		28	19		70	
11.9	53.10	26	38.9 5	48.73	26	62.7 1	52.32	32	15.5 13	44.58	83	38.0 24
21.8	53.36	28	38.7 2	48.99	28	62.6 1	52.64	35	14.2 8	45.41	92	36.2 18
31.8	53.64	30	38.9 6	49.27	29	62.2 8	52.99	37	13.4 2	46.33	99	34.9 13
												6
Apr. 10.8	53.94		39.5	49.56		61.4	53.36		13.2	47.32		34.3
		30	10		31	10		38	4		101	0
20.8	54.24	31	40.5 12	49.87	31	60.4 12	53.74	38	13.6 10	48.33	101	34.3 6
30.7	54.55	30	41.7 15	50.18	31	59.2 14	54.12	38	14.6 16	49.34	97	34.9 13
May 10.7	54.85	30	43.2 18	50.49	30	56.2 16	54.50	36	16.2 21	50.31	80	36.2 18
		28	19		29	17		34	25			23
20.7	55.15		45.0	50.79		56.2	54.86		18.3	51.21		38.0
30.7	55.43	26	46.9 20	51.08	27	54.5 18	55.20	31	20.8 28	52.01	68	40.3 27
June 9.6	55.69	24	48.9 20	51.35	25	52.7 17	55.51	26	23.6 31	52.69	55	43.0 31
		21			21	17		22	33		40	
19.6	55.93	17	50.9 20	51.60	18	49.3 16	55.77	17	26.7 34	53.24	23	46.1 33
29.6	56.14	13	53.0 19	51.81	14	47.7 14	55.99	11	30.0 34	53.64	6	49.4 35
July 9.5	56.31		55.0	51.99		46.3	56.16		33.4	53.87		52.9
												36
19.5	56.44	8	56.9 17	52.13	10	45.0 12	56.27	5	36.8 34	53.93	11	56.5 36
29.5	56.52	4	58.6 15	52.23	5	43.8 10	56.32	1	40.2 32	53.82	27	60.1 36
Aug. 8.5	56.56	1	60.1 14	52.28	1	42.8 7	56.31	6	43.4 30	53.55	43	63.7 34
		5			4	6		12	27		58	
18.4	56.55	8	61.5 9	52.29	7	42.1 6	56.25	17	46.4 24	53.12	72	67.1 29
28.4	56.50		62.7	52.25			56.13		49.1	52.54		70.2
Sept. 7.4	56.42		63.6	52.18		41.5	55.96		51.5	51.82		73.1
		11	7		10	4		21	21		84	
17.3	56.31	14	64.3 4	52.08	13	40.9 2	55.75	24	53.6 16	50.98	94	75.6 21
27.3	56.17	15	64.7 2	51.95	15	40.9 1	55.51	26	55.2 12	50.04	101	77.7 17
Oct. 7.3	56.02	16	64.9 0	51.80	15	41.0 2	55.25	28	56.4 7	49.03	106	79.4 12
		16			15			28	2		108	80.6 6
17.3	55.86		64.9	51.65		41.2	54.97		57.1	47.97		
27.2	55.70	15	64.7 5	51.50	14	41.6 6	54.69	27	57.3 8	46.89	108	81.2 1
Nov. 6.2	55.55	12	64.2 7	51.36	12	42.2 7	54.42	25	56.2 13	45.81	105	81.3 5
		10			10	8		22	17		99	
16.2	55.43	7	63.5 11	51.24	7	43.7 9	54.17	19	54.9 22	44.76	78	80.8 11
26.2	55.33	3	62.6 12	51.14	3	44.6 9	53.95	15	53.2 26	43.77		79.7 16
Dec. 6.1	55.26		61.5	51.07		45.5 10	53.76		53.2	42.88		78.1 21
16.1	55.23	0	60.3 14	51.04	1	46.5 10	53.61	10	51.0 29	42.10	64	76.0 26
26.1	55.23	4	58.9 14	51.05	4		53.51	5	48.4	41.46	48	73.4 29
36.0	55.27		57.5	51.09			53.46		45.5	40.98		70.5
Sec δ , Tan δ	1.008		+0.123	1.000		-0.019	1.452		+1.053	4.602		+4.492
Mean Place	53°.412		55''.16	48°.987		48''.67	53°.571		37''.33	50°.392		59''.47
D' δ , D ₀ δ	0.00		0.00	0.00		0.00	-0.02		-0.04	-0.10		-0.16
D δ , D ₀ δ	+0.2		-0.9	+0.2		-0.9	+0.2		-0.8	+0.2		-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	24 Vulpeculæ. Mag. 5.4		α² Capricorni. Mag. 3.8		β Capricorni. Mag. 3.2		α Pavonis. Mag. 2.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 20 13	° ' +24 23	h m 20 13	° ' -12 48	h m 20 16	° ' -15 3	h m 20 18	° ' -57 0
	s	"	s	"	s	"	s	"
Jan. 1.1	2.14	63.5	12.40	65.4	6.19	35.5	44.35	68.6
11.0	2.17 3	61.2 23	12.47 7	65.7 3	6.25 6	35.7 2	44.42 7	66.3 23
21.0	2.24 7	58.9 23	12.57 10	66.0 3	6.35 10	35.8 1	44.55 13	63.9 24
31.0	2.35 11	56.7 22	12.70 13	66.2 2	6.49 14	35.8 0	44.75 20	61.4 25
Feb. 10.0	2.49 14	54.6 21	12.87 17	66.2 0	6.66 17	35.7 1	45.01 26	59.0 24
	17	19	20	1	19	2	32	24
19.9	2.66	52.7	13.07	66.1	6.85	35.5	45.33	56.6
Mar. 1.9	2.87 21	51.1 16	13.29 22	65.9 2	7.07 22	35.1 4	45.69 36	54.3 23
11.9	3.11 24	49.9 12	13.53 24	65.5 4	7.32 25	34.6 5	46.10 41	52.1 22
21.8	3.38 27	49.2 7	13.80 27	64.9 6	7.59 27	33.9 7	46.55 45	50.1 20
31.8	3.66 28	48.9 3	14.09 29	64.1 8	7.88 29	33.0 9	47.03 48	48.3 18
	30	2	30	10	30	10	51	15
Apr. 10.8	3.96	49.1	14.39	63.1	8.18	32.0	47.54	46.8
20.8	4.27 31	49.8 7	14.70 31	62.0 11	8.49 31	30.9 11	48.06 52	45.5 13
30.7	4.59 32	51.0 12	15.02 32	60.8 12	8.81 32	29.7 12	48.59 53	44.5 10
May 10.7	4.91 32	52.6 16	15.34 32	59.5 13	9.14 33	28.4 13	49.12 53	43.9 6
20.7	5.22 31	54.6 20	15.66 32	58.2 13	9.46 32	27.1 13	49.64 52	43.6 3
	30	23	31	14	31	13	51	1
30.7	5.52	56.9	15.97	56.8	9.77	25.8	50.15	43.7
June 9.6	5.80 28	59.4 25	16.26 29	55.4 14	10.07 30	24.5 13	50.63 48	44.1 4
19.6	6.04 24	62.0 26	16.52 26	54.2 12	10.34 27	23.3 12	51.06 43	44.9 8
29.6	6.25 21	64.7 27	16.75 23	53.1 11	10.58 24	22.3 10	51.44 38	46.0 11
July 9.5	6.42 17	67 5 28	16.95 20	52.1 10	10.78 20	21.5 8	51.76 32	47.3 13
	13	28	16	8	16	7	25	16
19.5	6.55 8	70.3 26	17.11 11	51.3 6	10.94 11	20.8 5	52.01 17	48.9 18
29.5	6.63 4	72.9 24	17.22 6	50.7 5	11.05 7	20.3 4	52.18 10	50.7 19
Aug. 8.5	6.67 1	75.3 22	17.28 2	50.2 3	11.12 2	19.9 2	52.28 2	52.6 20
18.4	6.66 6	77.5 20	17.30 3	49.9 2	11.14 2	19.7 1	52.30 6	54.6 20
28.4	6.60 10	79.5 17	17.27 6	49.7 1	11.12 6	19.6 1	52.24 14	56.6 19
Sept. 7.4	6.50	81.2	17.21	49.6	11.06	19.7	52.10	58.5
17.4	6.37 13	82.6 14	17.11 10	49.7 1	10.96 10	19.9 2	51.91 19	60.2 17
27.3	6.21 16	83.7 11	16.98 13	49.9 2	10.84 12	20.2 3	51.67 24	61.6 14
Oct. 7.3	6.04 17	84.4 7	16.84 14	50.1 2	10.70 14	20.5 3	51.39 28	62.7 11
17.3	5.86 18	84.7 3	16.69 15	50.4 3	10.54 16	20.8 3	51.09 30	63.4 7
	18	0	15	3	16	3	31	3
27.2	5.68	84.7	16.54	50.7	10.38	21.1	50.78	63.7
Nov. 6.2	5.50 18	84.3 4	16.40 14	51.1 4	10.24 14	21.4 3	50.48 30	63.6 1
16.2	5.34 16	83.5 8	16.28 12	51.5 4	10.12 12	21.7 3	50.21 27	63.1 5
26.2	5.21 13	82.4 11	16.18 10	51.8 3	10.02 10	22.0 3	49.98 23	62.2 9
Dec. 6.1	5.10 11	80.9 15	16.11 7	52.2 4	9.95 7	22.3 3	49.80 18	60.9 13
	7	18	3	3	3	3	11	17
16.1	5.03	79.1	16.08	52.5	9.92	22.6	49.69	59.2
26.1	5.00 3	77.1 20	16.08 0	52.9 4	9.92 0	22.8 2	49.64 5	57.2 20
36.1	5.00 0	75.0 21	16.12 4	53.2 3	9.96 4	23.0 2	49.66 2	55.0 22
Sec δ, Tan δ	1.098	+0.454	1.025	-0.227	1.036	-0.269	1.837	-1.541
Mean Place	3 ^h .739	69 ^{''} .05	13 ^h .724	54 ^{''} .64	7 ^h .506	24 ^{''} .43	46 ^h .281	53 ^{''} .18
D'ψ α, Dω α	-0.01	-0.02	+0.01	+0.01	+0.01	+0.01	+0.03	+0.06
D'ψ δ, Dω δ	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cygni. Mag. 2.3			π Capricorni. Mag. 5.2			ρ Capricorni. Mag. 5.0			δ Cygni. Mag. 4.1		
	Right Ascension.		Declina- tion N.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	20	19	+39 58	20	22	-18 29	20	23	-18 6	20	25	+30 4
	s		"	s		"	s		"	s		"
Jan. 1.1	4.38		36.7	19.27		62.5	52.70		18.6	48.81		35.8
11.0	4.37	1	33.9 28	19.33	6	62.5 0	52.76	6	18.6 0	48.81	0	33.4 24
21.0	4.41	4	31.0 29	19.43	10	62.4 1	52.85	9	18.5 1	48.86	5	30.9 25
31.0	4.50	9	28.1 29	19.56	13	62.2 2	52.98	13	18.3 2	48.95	9	28.4 25
Feb. 10.0	4.63	13	25.4 27	19.72	16	61.9 3	53.14	16	18.0 3	49.08	13	26.0 24
		17	25 25		19	5 5		19	4 4		16	21 21
19.9	4.80		22.9	19.91		61.4	53.33		17.6	49.24		23.9
Mar. 1.9	5.02	22	20.7 22	20.13	22	60.8 6	53.55	22	17.0 6	49.44	20	22.1 18
11.9	5.28	26	19.0 17	20.38	25	60.1 7	53.79	24	16.3 7	49.67	23	20.7 14
21.9	5.57	29	17.8 12	20.65	27	59.3 8	54.06	27	15.5 8	49.93	26	19.7 10
31.8	5.88	31	17.1 7	20.94	29	58.3 10	54.35	29	14.5 10	50.22	29	19.2 5
		34	1 1		30	11 11		30	11 11		31	0 0
Apr. 10.8	6.22		17.0	21.24		57.2	54.65		13.4	50.53		19.2
20.8	6.57	35	17.4 4	21.56	32	56.0 12	54.97	32	12.2 12	50.85	32	19.8 6
30.7	6.93	36	18.4 10	21.89	33	54.7 13	55.30	33	10.9 13	51.18	33	20.9 11
May 10.7	7.29	36	20.0 16	22.23	34	53.4 13	55.63	33	9.6 13	51.51	33	22.4 15
20.7	7.63	34	22.0 20	22.56	33	52.1 13	55.96	33	8.3 13	51.84	33	24.4 20
		32	24 24		31	12 12		32	13 13		31	23 23
30.7	7.95		24.4	22.87		50.9	56.28		7.0	52.15		26.7
June 9.6	8.25	30	27.1 27	23.17	30	49.8 11	56.58	30	5.8 12	52.44	29	29.3 26
19.6	8.52	27	30.1 30	23.45	28	48.8 10	56.86	28	4.8 10	52.70	26	32.0 27
29.6	8.74	22	33.3 32	23.70	25	47.9 9	57.11	25	3.9 9	52.92	22	34.9 29
July 9.6	8.92	18	36.5 32	23.91	21	47.2 7	57.32	21	3.2 7	53.10	18	37.9 30
		12	32 32		17	5 5		17	6 6		14	30 30
19.5	9.04		39.7	24.08		46.7	57.49		2.6	53.24		40.9
29.5	9.11	7	42.9 32	24.21	13	46.3 4	57.62	13	2.2 4	53.33	9	43.8 29
Aug. 8.5	9.13	2	46.0 31	24.29	8	46.1 2	57.70	8	2.0 2	53.37	4	46.5 27
18.4	9.09	4	48.9 29	24.32	3	46.1 0	57.73	3	2.0 0	53.37	0	49.0 25
28.4	9.01	8	51.5 26	24.30	2	46.3 2	57.71	2	2.2 2	53.32	5	51.3 23
		13	23 23		6	2 2		6	2 2		10	20 20
Sept. 7.4	8.88		53.8	24.24		46.5	57.65		2.4	53.22		53.3
17.4	8.71	17	55.8 20	24.14	10	46.8 3	57.56	9	2.7 3	53.08	14	55.0 17
27.3	8.51	20	57.3 15	24.02	12	47.2 4	57.44	12	3.1 4	52.92	16	56.3 13
Oct. 7.3	8.29	22	58.4 11	23.88	14	47.6 4	57.30	14	3.5 4	52.74	18	57.2 9
17.3	8.05	24	59.1 7	23.73	15	48.0 4	57.15	15	3.9 4	52.55	19	57.8 6
		24	3 3		16	4 4		16	4 4		20	2 2
27.3	7.81		59.4	23.57		48.4	56.99		4.3	52.35		58.0
Nov. 6.2	7.58	23	59.1 3	23.42	15	48.7 3	56.84	15	4.6 3	52.16	19	57.7 3
16.2	7.36	22	58.3 8	23.29	13	49.0 3	56.71	13	4.9 3	51.98	18	57.0 7
26.2	7.17	19	57.1 12	23.19	10	49.2 2	56.61	10	5.1 2	51.83	15	55.9 11
Dec. 6.1	7.01	16	55.5 16	23.12	7	49.4 2	56.54	7	5.3 2	51.70	13	54.4 15
		12	20 20		4	1 1		4	1 1		9	18 18
16.1	6.89		53.5	23.08		49.5	56.50		5.4	51.61		52.6
26.1	6.81	8	51.1 24	23.08	0	49.5 0	56.50	0	5.4 0	51.55	6	50.5 21
36.1	6.77	4	48.4 27	23.11	3	49.5 0	56.53	3	5.4 0	51.53	2	48.2 23
Sec δ , Tan δ	1.305		+0.838	1.054		-0.334	1.052		-0.327	1.156		+0.579
Mean Place	6 ^h .337		39'''.71	20 ^h .569		50'''.97	53 ^h .992		7'''.07	50 ^h .492		39'''.82
D' ψ α , D ω α	-0.02		-0.03	+0.01		+0.01	+0.01		+0.01	-0.01		-0.02
D' ψ δ , D ω δ	+0.2		-0.8	+0.2		-0.8	+0.2		-0.8	+0.2		-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Cephei. Mag. 4.3		ϵ Delphini. Mag. 4.0		Groombridge 3241. Mag. 6.4		α Indi. Mag. 3.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 20 28 s	° ' +62 41 "	h m 20 29 s	° ' +11 0 "	h m 20 30 s	° ' +72 13 "	h m 20 31 s	° ' -47 35 "
Jan. 1.1	4.13	65.4	2.02	18.0	18.45	74.6	25.50	59.9
11.0	3.99 14	62.3 31	2.05 3	16.4 16	18.17 28	71.6 30	25.55 5	58.1 18
21.0	3.94 5	59.1 32	2.12 7	14.8 16	18.02 15	68.3 33	25.66 11	56.2 19
31.0	3.97 3	55.8 33	2.22 10	13.3 15	18.00 2	64.9 34	25.81 15	54.2 20
Feb. 10.0	4.09 12	52.5 33	2.35 13	11.9 14	18.11 11	61.6 33	26.01 20	52.2 20
	20	31	16	12	25	32	25	21
19.9	4.29	49.4	2.51	10.7	18.36	58.4	26.26	50.1
Mar. 1.9	4.57 28	46.6 28	2.70 19	9.7 10	18.73 37	55.5 29	26.55 29	48.1 20
11.9	4.92 35	44.3 23	2.92 22	9.1 6	19.21 48	53.0 25	26.87 32	46.1 20
21.9	5.33 41	42.5 18	3.17 25	8.8 3	19.79 58	51.0 20	27.23 36	44.2 19
31.8	5.80 47	41.2 13	3.44 27	8.9 1	20.44 65	49.6 14	27.61 38	42.4 18
	50	7	28	5	70	8	41	17
Apr. 10.8	6.30	40.5	3.72	9.4	21.14	48.8	28.02	40.7
20.8	6.82 52	40.5 0	4.02 30	10.2 8	21.88 74	48.6 2	28.45 43	39.3 14
30.7	7.35 53	41.2 7	4.33 31	11.4 12	22.63 75	49.1 5	28.89 44	38.1 12
May 10.7	7.87 52	42.5 13	4.64 31	13.0 16	23.36 73	50.2 11	29.33 44	37.1 10
20.7	8.37 50	44.3 18	4.95 31	14.8 18	24.06 70	51.9 17	29.77 44	36.4 7
	46	23	30	20	65	22	43	4
30.7	8.83	46.6	5.25	16.8	24.71	54.1	30.20	36.0
June 9.6	9.25 42	49.3 27	5.53 28	18.9 21	25.28 57	56.8 27	30.61 41	36.0 0
19.6	9.61 36	52.4 31	5.78 25	21.1 22	25.75 47	59.8 30	30.99 38	36.2 2
29.6	9.90 29	55.8 34	6.01 23	23.4 23	26.12 37	63.1 33	31.33 34	36.7 5
July 9.6	10.11 21	59.4 36	6.20 19	25.6 22	26.38 26	66.6 35	31.62 29	37.5 8
	13	36	15	22	14	36	23	11
19.5	10.24	63.0	6.35	27.8	26.52	70.2	31.85	38.6
29.5	10.29 5	66.6 36	6.46 11	29.8 20	26.54 2	73.9 37	32.02 17	39.9 13
Aug. 8.5	10.25 4	70.2 36	6.52 6	31.7 19	26.43 11	77.6 37	32.12 10	41.4 15
18.4	10.13 12	73.6 34	6.54 2	33.4 17	26.21 22	81.1 35	32.16 4	42.9 15
28.4	9.94 19	76.8 32	6.52 2	34.8 14	25.88 33	84.4 33	32.14 2	44.5 16
	27	29	6	12	44	30	8	16
Sept. 7.4	9.67	79.7	6.46	36.0	25.44	87.4	32.06	46.1
17.4	9.34 33	82.3 26	6.36 10	36.9 9	24.91 53	90.1 27	31.93 13	47.6 15
27.3	8.96 38	84.5 22	6.23 13	37.6 7	24.31 60	92.4 23	31.75 18	48.9 13
Oct. 7.3	8.54 42	86.2 17	6.09 14	38.0 4	23.65 66	94.3 19	31.54 21	50.0 11
17.3	8.10 44	87.4 12	5.94 15	38.2 2	22.94 71	95.7 14	31.31 23	50.8 8
	46	7	16	1	73	9	24	5
27.3	7.64	88.1	5.78	38.1	22.21	96.6	31.07	51.3
Nov. 6.2	7.18 46	88.2 1	5.63 15	37.8 3	21.47 74	96.9 3	30.84 23	51.4 1
16.2	6.74 44	87.7 5	5.49 14	37.2 6	20.75 72	96.6 3	30.64 20	51.2 2
26.2	6.33 41	86.7 10	5.38 11	36.3 9	20.07 68	95.7 9	30.46 18	50.7 5
Dec. 6.1	5.96 37	85.2 15	5.29 9	35.2 11	19.44 63	94.3 14	30.32 14	49.8 9
	32	20	6	12	55	19	9	12
16.1	5.64	83.2	5.23	34.0	18.89	92.4	30.23	48.6
26.1	5.39 25	80.7 25	5.20 3	32.6 14	18.43 46	90.0 24	30.19 4	47.1 15
36.1	5.21 18	77.8 29	5.21 1	31.0 16	18.08 35	87.1 29	30.21 2	45.4 17
Sec δ , Tan δ	2.180	+1.938	1.019	+0.194	+3.278	+3.122	1.483	-1.095
Mean Place	7 ^s .469	65 ^{''} .02	3 ^s .411	24 ^{''} .93	23 ^s .478	73 ^{''} .15	27 ^s .041	44 ^{''} .70
D' ψ u , D ω u	-0.04	-0.08	0.00	-0.01	-0.07	-0.13	+0.02	+0.04
D ψ δ , D ω δ	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Delphini. Mag. 3.7		ν Capricorni. Mag. 5.3		α Delphini. Mag. 3.9		β Pavonis. Mag. 3.6	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 20 33	° ' +14 17	h m 20 35	° ' -18 26	h m 20 35	° ' +15 36	h m 20 37	° ' -66 30
	s	"	s	"	s	"	s	"
Jan. 1.1	26.78	24.6	4.68	55.3	34.41	11.3	5.58	77.5
11.1	26.80 2	22.9 17	4.73 5	55.2 1	34.43 2	9.5 18	5.59 1	74.8 27
21.0	26.86 6	21.1 18	4.81 8	55.0 2	34.49 6	7.7 18	5.69 10	71.9 29
31.0	26.95 9	19.4 17	4.93 12	54.8 2	34.58 9	5.9 18	5.89 20	69.0 29
Feb. 10.0	27.08 13	17.8 16	5.08 15	54.5 3	34.70 12	4.3 16	6.17 28	66.0 30
	16	14	18	5	15	14	36	29
19.9	27.24	16.4	5.26	54.0	34.85	2.9	6.53	63.1
Mar. 1.9	27.43 19	15.3 11	5.47 21	53.4 6	35.04 19	1.7 12	6.96 43	60.3 28
11.9	27.64 21	14.5 8	5.70 23	52.6 8	35.26 22	0.8 9	7.46 50	57.6 27
21.9	27.88 24	14.1 4	5.96 26	51.7 9	35.50 24	0.3 5	8.02 56	55.2 24
31.8	28.15 27	14.1 0	6.24 28	50.6 11	35.77 27	0.2 1	8.63 61	53.1 21
	29	4	30	12	28	4	65	18
Apr. 10.8	28.44	14.5	6.54	49.4	36.05	0.6	9.28	51.3
20.8	28.74 30	15.3 8	6.86 32	48.1 13	36.35 30	1.4 8	9.95 67	49.8 15
30.8	29.05 31	16.5 12	7.19 33	46.8 13	36.66 31	2.6 12	10.64 69	48.7 11
May 10.7	29.36 31	18.0 15	7.52 33	45.4 14	36.98 32	4.1 15	11.34 70	47.9 8
20.7	29.67 31	19.8 18	7.85 33	44.0 14	37.29 31	5.9 18	12.03 69	47.6 3
	30	21	32	13	30	21	67	1
30.7	29.97	21.9	8.17	42.7	37.59	8.0	12.70	47.7
June 9.6	30.26 29	24.1 22	8.48 31	41.5 12	37.87 28	10.3 23	13.33 63	48.2 5
19.6	30.52 26	26.5 24	8.77 29	40.4 11	38.13 26	12.7 24	13.91 58	49.2 10
29.6	30.75 23	28.9 24	9.03 26	39.5 9	38.36 23	15.1 24	14.42 51	50.5 13
July 9.6	30.94 19	31.3 24	9.25 22	38.7 8	38.56 20	17.5 24	14.86 44	52.1 16
	15	23	18	6	16	24	35	19
19.5	31.09	33.6	9.43	38.1	38.72	19.9	15.21	54.0
29.5	31.20 11	35.8 22	9.56 13	37.7 4	38.83 11	22.2 23	15.46 25	56.2 22
Aug. 8.5	31.27 7	37.8 20	9.65 9	37.5 2	38.89 6	24.3 21	15.60 14	58.5 23
18.5	31.29 2	39.6 18	9.69 4	37.5 0	38.91 2	26.2 19	15.64 4	60.9 24
28.4	31.27 2	41.2 16	9.69 0	37.6 1	38.89 2	27.9 17	15.57 7	63.3 24
	6	14	5	3	6	14	16	22
Sept. 7.4	31.21	42.6	9.64	37.9	38.83	29.3	15.41	65.5
17.4	31.11 10	43.7 11	9.56 8	38.3 4	38.73 10	30.5 12	15.16 25	67.5 20
27.3	30.98 13	44.5 8	9.45 11	38.7 4	38.61 12	31.4 9	14.83 33	69.3 18
Oct. 7.3	30.83 15	45.1 6	9.31 14	39.1 4	38.46 15	32.0 6	14.44 39	70.7 14
17.3	30.68 15	45.4 3	9.16 15	39.6 5	38.30 16	32.3 3	14.01 43	71.7 10
	16	1	16	4	16	0	44	5
27.3	30.52	45.3	9.00	40.0	38.14	32.3	13.57	72.2
Nov. 6.2	30.36 16	45.0 3	8.85 15	40.4 4	37.98 16	32.0 3	13.13 44	72.2 0
16.2	30.22 14	44.4 6	8.72 13	40.7 3	37.84 14	31.4 6	12.71 42	71.6 6
26.2	30.10 12	43.5 9	8.61 11	40.9 2	37.72 12	30.5 9	12.34 37	70.6 10
Dec. 6.2	30.01 9	42.4 11	8.53 8	41.1 2	37.62 10	29.4 11	12.04 30	69.1 15
	7	13	5	1	7	14	23	19
16.1	29.94	41.1	8.48	41.2	37.55	28.0	11.81	67.2
26.1	29.91 3	39.6 15	8.47 1	41.2 0	37.52 3	26.4 16	11.67 14	64.9 23
36.1	29.91 0	37.9 17	8.50 3	41.2 0	37.52 0	24.7 17	11.62 5	62.3 26
Sec δ , Tan δ	1.032	+0.255	1 054	-0.333	1.038	+0.279	2.510	-2.302
Mean Place	28°.198	30'''.79	5°.933	43'''.67	35°.841	17'''.17	7°.908	60'''.70
D ϕ α , D ω α	-0.01	-0.01	+0.01	+0.01	-0.01	-0.01	+0.05	+0.10
D ϕ δ , D ω δ	+0.2	-0.8	+0.2	-0.8	+0.2	-0.8	+0.3	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Cygni. Mag. 1.3		δ Delphini. Mag. 4.5		ψ Capricorni. Mag. 4.3		γ Delphini seq. Mag. 4.5	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 20 38 s	° ' +44 57 "	h m 20 39 s	° ' +14 45 "	h m 20 40 s	° ' -25 34 "	h m 20 42 s	° ' +15 48 "
Jan. 1.1	25.84	67.3	22.43	36.5	55.58	75.2	35.90	31.2
11.1	25.79 5	64.6 27	22.45 2	34.8 17	55.62 4	74.7 5	35.92 2	29.4 18
21.0	25.79 0	61.7 29	22.50 5	33.0 18	55.70 8	74.1 6	35.97 5	27.6 18
31.0	25.85 6	58.7 30	22.59 9	31.3 17	55.82 12	73.4 7	36.05 8	25.9 17
Feb. 10.0	25.96 11	55.8 29	22.71 12	29.7 16	55.97 15	72.6 8	36.16 11	24.2 17
	15	27	15	14	18	9	15	15
19.9	26.11	53.1	22.86	28.3	56.15	71.7	36.31	22.7
Mar. 1.9	26.31 20	50.7 24	23.04 18	27.2 11	56.36 21	70.6 11	36.49 18	21.5 12
11.9	26.56 25	48.7 20	23.25 21	26.4 8	56.60 24	69.4 12	36.70 21	20.7 8
21.9	26.85 29	47.2 15	23.49 24	26.0 4	56.87 27	68.2 12	36.94 24	20.2 5
31.8	27.17 32	46.2 10	23.76 27	25.9 1	57.16 29	66.9 13	37.20 26	20.1 1
	35	4	28	3	32	13	28	3
Apr. 10.8	27.52	45.8	24.04	26.2	57.48	65.6	37.48	20.4
20.8	27.89 37	46.0 2	24.34 30	27.0 8	57.81 33	64.2 14	37.78 30	21.2 8
30.8	28.27 38	46.8 8	24.65 31	28.2 12	58.15 34	62.8 14	38.09 31	22.3 11
May 10.7	28.65 38	48.2 14	24.96 31	29.7 15	58.50 35	61.5 13	38.41 32	23.8 15
20.7	29.02 37	50.1 19	25.27 31	31.5 18	58.84 34	60.2 13	38.72 31	25.6 18
	35	23	31	20	34	12	30	21
30.7	29.37	52.4	25.58	33.5	59.18	59.0	39.02	27.7
June 9.6	29.70 33	55.0 26	25.87 29	35.8 23	59.51 33	58.0 10	39.31 29	30.0 23
19.6	30.00 30	58.0 30	26.13 26	38.2 24	59.81 30	57.2 8	39.58 27	32.4 24
29.6	30.25 25	61.2 32	26.36 23	40.6 24	60.08 27	56.6 6	39.82 24	34.8 24
July 9.6	30.45 20	64.5 33	26.56 20	43.0 24	60.32 24	56.2 4	40.02 20	37.2 24
	15	34	16	24	20	2	16	24
19.5	30.60	67.9	26.72	45.4	60.52	56.0	40.18	39.6
29.5	30.69 9	71.3 34	26.84 12	47.6 22	60.67 15	56.1 1	40.30 12	41.9 23
Aug. 8.5	30.72 3	74.6 33	26.91 7	49.7 21	60.77 10	56.3 2	40.37 7	44.0 21
18.5	30.70 2	77.7 31	26.93 2	51.6 19	60.82 5	56.7 4	40.39 2	46.0 20
28.4	30.63 7	80.6 29	26.91 2	53.2 16	60.82 0	57.2 5	40.37 2	47.7 17
	13	26	6	14	5	6	5	15
Sept. 7.4	30.50	83.2	26.85	54.6	60.77	57.8	40.32	49.2
17.4	30.33 17	85.5 23	26.76 9	55.7 11	60.68 9	58.5 7	40.23 9	50.4 12
27.3	30.12 21	87.4 19	26.64 12	56.6 9	60.57 11	59.2 7	40.11 12	51.3 9
Oct. 7.3	29.89 23	88.8 14	26.50 14	57.2 6	60.43 14	59.8 6	39.97 14	51.9 6
17.3	29.64 25	89.8 10	26.34 16	57.5 3	60.27 16	60.4 6	39.81 16	52.3 4
	26	5	16	0	16	5	16	0
27.3	29.38	90.3	26.18	57.5	60.11	60.9	39.65	52.3
Nov. 6.2	29.12 26	90.4 1	26.02 16	57.2 3	59.95 16	61.3 4	39.49 16	52.0 3
16.2	28.87 25	89.9 5	25.88 14	56.6 6	59.81 14	61.5 2	39.35 14	51.5 5
26.2	28.65 22	88.9 10	25.76 12	55.8 8	59.69 12	61.6 1	39.22 13	50.7 8
Dec. 6.2	28.45 20	87.4 15	25.66 10	54.7 11	59.60 9	61.6 0	39.12 10	50.7 11
	16	19	7	13	6	2	7	14
16.1	28.29	85.5	25.59	53.4	59.54	61.4	39.05	48.2
26.1	28.17 12	83.2 23	25.55 4	51.9 15	59.52 2	61.1 3	39.01 4	46.6 16
36.1	28.09 8	80.6 26	25.55 0	50.2 17	59.54 2	60.7 4	39.00 1	44.9 17
Sec δ , Tan δ	1.414	+0.999	1.034	+0.263	1.109	-0.479	1.039	+0.283
Mean Place	27°.940	68''.26	23°.841	42''.38	56°.825	62''.42	37°.315	36''.71
D' ψ α , D ω α	-0.02	-0.04	-0.01	-0.01	+0.01	+0.02	-0.01	-0.01
D ψ δ , D ω δ	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8	+0.3	-0.8

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Cygni. Mag. 2.6		ε Aquarii. Mag. 3.8		η Cephei. Mag. 3.6		μ Aquarii. Mag. 4.8	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 20 42	° ' +33 38	h m 20 42	° ' − 9 48	h m 20 43	° ' +61 29	h m 20 47	° ' − 9 18
	s	"	s	"	s	"	s	"
Jan. 1.1	39.73	35.5	56.83	63.6	28.15	63.9	56.54	47.7
11.1	39.71 2	33.1 24	56.86 3	64.0 4	28.00 15	61.0 29	56.57 3	48.2 5
21.0	39.73 2	30.6 25	56.93 7	64.4 4	27.93 7	57.8 32	56.63 6	48.6 4
31.0	39.80 7	28.0 26	57.03 10	64.7 3	27.94 1	54.5 33	56.73 10	48.9 3
Feb. 10.0	39.91 11	25.5 25	57.17 14	64.8 1	28.03 9	51.3 32	56.86 13	49.0 1
	15	23	16	0	17	30	16	0
19.9	40.06	23.2	57.33	64.8	28.20	48.3	57.02	49.0
Mar. 1.9	40.24 18	21.2 20	57.52 19	64.6 2	28.44 24	45.5 28	57.20 18	48.8 2
11.9	40.46 22	19.6 16	57.74 22	64.2 4	28.75 31	43.1 24	57.41 21	48.5 3
21.9	40.72 26	18.5 11	57.98 24	63.6 6	29.13 38	41.2 19	57.65 24	47.9 6
31.8	41.01 29	17.8 7	58.25 27	62.8 8	29.56 43	39.8 14	57.92 27	47.1 8
	31	1	29	10	48	8	28	10
Apr. 10.8	41.32	17.7	58.54	61.8	30.04	39.0	58.20	46.1
20.8	41.64 32	18.1 4	58.84 30	60.6 12	30.54 50	38.9 1	58.50 30	44.9 12
30.8	41.98 34	19.0 9	59.15 31	59.3 13	31.05 51	39.4 5	58.81 31	43.5 14
May 10.7	42.32 34	20.4 14	59.47 32	57.8 15	31.56 51	40.5 11	59.13 32	42.0 15
20.7	42.66 34	22.3 19	59.79 32	56.2 16	32.06 50	42.2 17	59.45 32	40.4 16
	33	23	31	16	47	22	32	16
30.7	42.99	24.6	60.10	54.6	32.53	44.4	59.77	38.8
June 9.6	43.30 31	27.1 25	60.40 30	53.1 15	32.96 43	47.1 27	60.07 30	37.2 16
19.6	43.58 28	29.9 28	60.68 28	51.6 15	33.33 37	50.2 31	60.35 28	35.7 15
29.6	43.82 24	32.9 30	60.93 25	50.2 14	33.64 31	53.5 33	60.61 26	34.3 14
July 9.6	44.02 20	36.0 31	61.15 22	49.0 12	33.88 24	57.0 35	60.83 22	33.0 13
	15	31	18	11	16	37	18	11
19.5	44.17	39.1	61.33	47.9	34.04	60.7	61.01	31.9
29.5	44.28 11	42.1 30	61.47 14	47.0 9	34.12 8	64.4 37	61.15 14	30.9 10
Aug. 8.5	44.34 6	45.1 30	61.56 9	46.3 7	34.12 0	68.0 36	61.25 10	30.1 8
18.5	44.34 0	47.9 28	61.61 5	45.7 6	34.05 7	71.5 35	61.30 5	29.5 6
28.4	44.30 4	50.4 25	61.61 0	45.3 4	33.90 15	74.8 33	61.30 0	29.1 4
	8	22	4	2	22	31	4	2
Sept. 7.4	44.22	52.6	61.57	45.1	33.68	77.9	61.26	28.9
17.4	44.09 13	54.5 19	61.49 8	45.1 0	33.39 29	80.6 27	61.19 7	28.8 1
27.3	43.93 16	56.1 16	61.38 11	45.2 1	33.05 34	82.9 23	61.09 10	28.9 1
Oct. 7.3	43.75 18	57.3 12	61.25 13	45.4 2	32.67 38	84.8 19	60.97 12	29.1 2
17.3	43.55 20	58.1 8	61.11 14	45.7 3	32.26 41	86.2 14	60.83 14	29.4 3
	20	4	14	3	43	9	15	3
27.3	43.35	58.5	60.97	46.0	31.83	87.1	60.68	29.7
Nov. 6.2	43.15 20	58.4 1	60.83 14	46.4 4	31.40 43	87.5 4	60.54 14	30.1 4
16.2	42.96 19	57.9 5	60.70 13	46.8 4	30.98 42	87.3 2	60.41 13	30.5 4
26.2	42.79 17	57.0 9	60.59 11	47.3 5	30.59 39	86.5 8	60.30 11	31.0 5
Dec. 6.2	42.65 14	55.6 14	60.51 8	47.8 5	30.23 36	85.2 13	60.22 8	31.5 5
	11	17	5	5	32	18	6	5
16.1	42.54	53.9	60.46	48.3	29.91	83.4	60.16	32.0
26.1	42.46 8	51.9 20	60.44 2	48.7 4	29.65 26	81.1 23	60.14 2	32.5 5
36.1	42.42 4	49.6 23	60.45 1	49.1 4	29.46 19	78.3 28	60.15 1	33.0 5
Sec δ, Tan δ	1.201	+0.665	1.015	−0.173	2.096	+1.842	1.013	−0.164
Mean Place	41°.459	37''.90	58°.057	53''.41	31°.328	62''.26	57°.755	37''.69
D'ϕ α, Dω α	−0.01	−0.03	0.00	+0.01	−0.04	−0.08	0.00	+0.01
Dϕ δ, Dω δ	+0.3	−0.8	+0.3	−0.8	+0.3	−0.8	+0.3	−0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Indi. Mag. 3.7		32 Vulpeculæ. Mag. 5.2		220 Draconis (<i>Heis</i>). Mag. 5.6		γ Cygni. Mag. 4.0	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 20 47 s	° ' -58 46 "	h m 20 50 s	° ' +27 43 "	h m 20 51 s	° ' +80 13 "	h m 20 53 s	° ' +40 49 "
Jan. 1.1	59.38	75.5	49.53	31.5	25.35	39.9	53.84	53.6
11.1	59.39 ¹	73.2 ²³	49.52 ¹	29.3 ²²	24.65 ⁷⁰	37.1 ²⁸	53.79 ⁵	51.0 ²⁶
21.0	59.47 ⁸	70.7 ²⁵	49.54 ²	27.0 ²³	24.17 ⁴⁸	34.0 ³¹	53.78 ¹	48.3 ²⁷
31.0	59.61 ¹⁴	68.1 ²⁶	49.60 ⁶	24.7 ²³	23.93 ²⁴	30.8 ³²	53.82 ⁴	45.5 ²⁸
Feb. 10.0	59.82 ²¹	65.4 ²⁷	49.70 ¹⁰	22.5 ²²	23.94 ¹	27.5 ³³	53.91 ⁹	42.8 ²⁷
	27	27	14	20	25	32	14	26
20.0	60.09	62.7	49.84	20.5	24.19	24.3	54.05	40.2
Mar. 1.9	60.42 ³³	60.1 ²⁶	50.02 ¹⁸	18.7 ¹⁸	24.68 ⁴⁹	21.3 ³⁰	54.23 ¹⁸	37.9 ²³
11.9	60.80 ³⁸	57.6 ²⁵	50.23 ²¹	17.3 ¹⁴	25.39 ⁷¹	18.6 ²⁷	54.45 ²²	36.0 ¹⁹
21.9	61.22 ⁴²	55.2 ²⁴	50.47 ²⁴	16.3 ¹⁰	26.29 ⁹⁰	16.3 ²³	54.71 ²⁶	34.5 ¹⁵
31.8	61.69 ⁴⁷	53.0 ²²	50.74 ²⁷	15.8 ⁵	27.34 ¹⁰⁵	14.5 ¹⁸	55.01 ³⁰	33.6 ⁹
	50	20	29	0	117	11	32	4
Apr. 10.8	62.19	51.0	51.03	15.8	28.51	13.4	55.33	33.2
20.8	62.71 ⁵²	49.3 ¹⁷	51.34 ³¹	16.3 ⁵	29.75 ¹²⁴	12.9 ⁵	55.67 ³⁴	33.3 ¹
30.8	63.26 ⁵⁵	48.0 ¹³	51.66 ³²	17.2 ⁹	31.03 ¹²⁸	13.0 ¹	56.03 ³⁶	34.0 ⁷
May 10.7	63.82 ⁵⁶	47.0 ¹⁰	51.99 ³³	18.6 ¹⁴	32.30 ¹²⁷	13.7 ⁷	56.40 ³⁷	35.3 ¹³
20.7	64.37 ⁵⁵	46.4 ⁶	52.32 ³³	20.4 ¹⁸	33.51 ¹²¹	15.0 ¹³	56.76 ³⁶	37.1 ¹⁸
	54	3	32	22	112	18	35	22
30.7	64.91	46.1	52.64	22.6	34.63	16.8	57.11	39.3
June 9.7	65.42 ⁵¹	46.2 ¹	52.94 ³⁰	25.1 ²⁵	35.63 ¹⁰⁰	19.1 ²³	57.44 ³³	41.8 ²⁵
19.6	65.90 ⁴⁸	46.7 ⁵	53.22 ²⁸	27.8 ²⁷	36.48 ⁸⁵	21.9 ²⁸	57.74 ³⁰	44.7 ²⁹
29.6	66.33 ⁴³	47.6 ⁹	53.47 ²⁵	30.6 ²⁸	37.16 ⁶⁸	25.0 ³¹	58.00 ²⁶	47.8 ³¹
July 9.6	66.70 ³⁷	48.9 ¹³	53.68 ²¹	33.5 ²⁹	37.64 ⁴⁸	28.4 ³⁴	58.22 ²³	51.0 ³²
	30	15	16	29	27	35	17	33
19.5	67.00	50.4	53.84	36.4	37.91	31.9	58.39	54.3
29.5	67.23 ²³	52.2 ¹⁸	53.96 ¹²	39.2 ²⁸	37.98 ⁷	35.5 ³⁶	58.50 ¹¹	57.6 ³³
Aug. 8.5	67.38 ¹⁵	54.1 ¹⁹	54.03 ⁷	41.9 ²⁷	37.84 ¹⁴	39.2 ³⁷	58.56 ⁶	60.8 ³²
18.5	67.45 ⁷	56.2 ²¹	54.05 ²	44.4 ²⁵	37.49 ³⁵	42.8 ³⁶	58.57 ¹	63.9 ³¹
28.4	67.43 ²	58.3 ²¹	54.03 ²	46.7 ²³	36.94 ⁵⁵	46.3 ³⁵	58.53 ⁴	66.7 ²⁸
	10	21	6	21	74	33	9	26
Sept. 7.4	67.33	60.4	53.97	48.8	36.20	49.6	58.44	69.3
17.4	67.16 ¹⁷	62.3 ¹⁹	53.87 ¹⁰	50.6 ¹⁸	35.30 ⁹⁰	52.6 ³⁰	58.30 ¹⁴	71.5 ²²
27.4	66.93 ²³	64.0 ¹⁷	53.73 ¹⁴	52.0 ¹⁴	34.25 ¹⁰⁵	55.3 ²⁷	58.13 ¹⁷	73.4 ¹⁹
Oct. 7.3	66.66 ²⁷	65.4 ¹⁴	53.57 ¹⁶	53.1 ¹¹	33.07 ¹¹⁸	57.6 ²³	57.93 ²⁰	74.9 ¹⁵
17.3	66.35 ³¹	66.5 ¹¹	53.39 ¹⁸	53.8 ⁷	31.80 ¹²⁷	59.4 ¹⁸	57.71 ²²	76.0 ¹¹
	32	7	18	3	134	13	23	6
27.3	66.03	67.2	53.21	54.1	30.46	60.7	57.48	76.6
Nov. 6.2	65.71 ³²	67.4 ²	53.03 ¹⁸	54.0 ¹	29.09 ¹³⁷	61.4 ⁷	57.25 ²³	76.7 ¹
16.2	65.41 ³⁰	67.1 ³	52.86 ¹⁷	53.5 ⁵	27.72 ¹³⁷	61.6 ²	57.03 ²²	76.4 ³
26.2	65.14 ²⁷	66.4 ⁷	52.71 ¹⁵	52.7 ⁸	26.39 ¹³³	61.2 ⁴	56.82 ²¹	75.6 ⁸
Dec. 6.2	64.91 ²³	65.3 ¹¹	52.58 ¹³	51.5 ¹²	25.13 ¹²⁶	60.2 ¹⁰	56.64 ¹⁸	74.3 ¹³
	17	15	10	16	114	15	15	17
16.1	64.74	63.8	52.48	49.9	23.99	58.7	56.49	72.6
26.1	64.64 ¹⁰	61.9 ¹⁹	52.41 ⁷	48.0 ¹⁹	22.99 ¹⁰⁰	56.7 ²⁰	56.38 ¹¹	70.5 ²¹
36.1	64.61 ³	59.7 ²²	52.37 ⁴	45.9 ²¹	22.17 ⁸²	54.1 ²⁶	56.30 ⁸	68.1 ²⁴
Sec δ , Tan δ	1.930	-1.650	1.130	+0.526	5.891	+5.806	1.321	+0.864
Mean Place	61 ^s .131	58 ^{''} .65	51 ^s .112	34 ^{''} .48	34 ^s .234	35 ^{''} .89	55 ^s .747	54 ^{''} .05
D' ψ α , D ω α	+0.03	+0.07	-0.01	-0.02	-0.11	-0.26	-0.02	-0.04
D ψ δ , D ω δ	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Octantis. Mag. 5.2		γ Microscopii. Mag. 4.7		θ Capricorni. Mag. 4.2		ξ Cygni. Mag. 3.9	
	Right Ascension.	Declina- tion S.	Right Ascension	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 20 54 s	° ' -77 21 "	h m 20 55 s	° ' -32 35 "	h m 21 1 s	° ' -17 34 "	h m 21 1 s	° ' +43 34 "
Jan. 1.1	9.21	43.2	56.30	68.3	2.35	56.8	43.96	50.1
11.1	9.06 15	40.2 30	56.33 3	67.4 9	2.37 2	56.7 1	43.89 7	47.5 26
21.0	9.09 3	36.9 33	56.40 7	66.4 10	2.43 6	56.6 1	43.87 2	44.7 28
31.0	9.29 20	33.5 34	56.50 10	65.2 12	2.52 9	56.4 2	43.90 3	41.9 28
Feb. 10.0	9.65 36	30.1 34	56.64 14	63.9 13	2.64 12	56.0 4	43.98 8	39.1 28
	52	34	18	14	15	6	12	27
20.0	10.17	26.7	56.82	62.5	2.79	55.4	44.10	36.4
Mar. 1.9	10.83 66	23.5 32	57.03 21	61.0 15	2.97 18	54.7 7	44.27 17	34.0 24
11.9	11.62 79	20.5 30	57.27 24	59.4 16	3.18 21	53.9 8	44.49 22	32.0 20
21.9	12.53 91	17.7 28	57.54 27	57.8 16	3.42 24	52.9 10	44.75 26	30.4 16
31.8	13.53 100	15.2 25	57.84 30	56.2 16	3 26	51.7 12	45.05 30	29.3 11
	108	21	32	17	29	13	33	5
Apr. 10.8	14.61	13.1	58.16	54.5	3.97	50.4	45.38	28.8
20.8	15.75 114	11.4 17	58.50 34	52.9 16	4.28 31	49.0 14	45.73 35	28.8 0
30.8	16.92 117	10.2 12	58.86 36	51.4 15	4.60 32	47.5 15	46.10 37	29.4 6
May 10.7	18.11 119	9.4 8	59.23 37	50.0 14	4.93 33	46.0 15	46.48 38	30.5 11
20.7	19.29 118	9.1 3	59.60 37	48.8 12	5 26 33	44 5 15	46.86 38	32.2 17
	115	2	37	11	33	15	37	22
30.7	20.44	9.3	59.97	47.7	5.59	43.0	47.23	34.4
June 9.7	21.53 109	9.9 6	60.32 35	46.8 9	5.91 32	41.6 14	47.57 34	36.9 25
19.6	22.54 101	11.0 11	60.65 33	46.2 6	6.21 30	40.3 13	47.88 31	39.7 28
29.6	23.44 90	12.5 15	60.95 30	45.8 4	6.48 27	39.2 11	48.15 27	42.8 31
July 9.6	24.21 77	14.4 19	61.21 26	45.7 1	6.72 24	38.3 9	48.38 23	46.1 33
	61	22	22	1	21	7	18	34
19.5	24.82	16.6	61.43	45.8	6.93	37.6	48.56	49.5
29.5	25.26 44	19.1 25	61.61 18	46.2 4	7.09 16	37.0 6	48.69 13	52.8 33
Aug. 8.5	25.52 26	21.8 27	61.73 12	46.8 6	7.20 11	36.7 3	48.76 7	56.1 33
18.5	25.60 8	24.5 27	61.80 7	47.5 7	7.26 6	36.6 1	48.77 1	59.3 32
28.4	25.49 11	27.2 27	61.81 1	48.4 9	7.28 2	36.7 1	48.73 4	62.3 30
	29	26	3	10	2	2	9	27
Sept. 7.4	25.20	29.8	61.78	49.4	7.26	36.9	48.64	65.0
17.4	24.74 46	32.2 24	61.70 8	50.4 10	7.20 6	37.2 3	48.50 14	67.4 24
27.4	24.14 60	34.3 21	61.58 12	51.4 10	7.10 10	37.6 4	48.32 18	69.4 20
Oct. 7.3	23.42 72	36.0 17	61.43 15	52.3 9	6.98 12	38.1 5	48.12 20	71.1 17
17.3	22.61 81	37.2 12	61.27 16	53.1 8	6.84 14	38.6 5	47.89 23	72.3 12
	86	6	17	7	15	5	24	8
27.3	21.75	37.8	61.10	53.8	6.69	39.1	47.65	73.1
Nov. 6.2	20.88 87	37.9 1	60.93 17	54.3 5	6.55 14	39.6 5	47.41 24	73.4 3
16.2	20.03 85	37.4 5	60.77 16	54.5 2	6.42 13	40.0 4	47.18 23	73.1 3
26.2	19.25 78	36.3 11	60.63 14	54.5 0	6.30 12	40.3 3	46.96 22	72.4 7
Dec. 6.2	18.56 69	34.6 17	60.52 11	54.3 2	6.20 10	40.6 3	46.76 20	71.2 12
	56	21	7	4	6	2	17	16
16.1	18.00	32.5	60.45	53.9	6.14	40.8	46.59	69.6
26.1	17.59 41	29.9 26	60.41 4	53.3 6	6.11 3	40.9 1	46.46 13	67.5 21
36.1	17.33 26	27.0 29	60.41 0	52.4 9	6.11 0	40.9 0	46.36 10	65.1 24
Sec δ , Tan δ	4.569	-4.459	1.187	-0.639	1.049	-0.317	1.380	+0.952
Mean Place	12 ^s .887	25'' .20	57 ^s .513	54'' .26	3 ^s .500	45'' .26	45 ^s .949	49'' .49
D' ψ a , D ω a	+0.09	+0.20	+0.01	+0.03	+0.01	+0.02	-0.02	-0.05
D ψ δ , D ω δ	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	61 Cygni <i>pr.</i> Mag. 5.6		♈ Aquarii. Mag. 4.5		Bradley 2777. Mag. 5.9		♐ Piscis Australis. Mag. 5.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 21 2	° ' +38 18	h m 21 4	° ' -11 43	h m 21 7	° ' +77 46	h m 21 8	° ' -27 58
	s	"	s	"	s	"	s	"
Jan. 1.1	57.91	75.2	50.23	38.2	8.75	30.9	6.83	42.5
11.1	57.87 4	72.8 24	50.24 1	38.5 3	8.16 59	28.2 27	6.84 1	41.9 6
21.0	57.87 0	70.3 25	50.29 5	38.7 2	7.74 42	25.2 30	6.89 5	41.1 8
31.0	57.92 5	67.7 26	50.37 8	38.8 1	7.51 23	22.0 32	6.98 9	40.2 9
Feb. 10.0	58.02 10	65.2 25	50.48 11	38.8 0	7.47 4	18.7 33	7.10 12	39.2 10
	14	24	14	2	15	32	15	12
20.0	58.16	62.8	50.62	38.6	7.62	15.5	7.25	38.0
Mar. 1.9	58.34 18	60.7 21	50.79 17	38.2 4	7.96 34	12.4 31	7.44 19	36.7 13
11.9	58.56 22	59.0 17	50.99 20	37.7 5	8.48 52	9.6 28	7.66 22	35.3 14
21.9	58.82 26	57.7 13	51.22 23	37.0 7	9.16 68	7.2 24	7.91 25	33.8 15
31.9	59.11 29	56.9 8	51.48 26	36.0 10	9.98 82	5.3 19	8.19 28	32.2 16
	33	3	28	12	93	13	30	16
Apr. 10.8	59.44	56.6	51.76	34.8	10.91	4.0	8.49	30.6
20.8	59.79 35	56.9 3	52.05 29	33.5 13	11.91 100	3.3 7	8.81 32	29.0 16
30.8	60.15 36	57.7 8	52.36 31	32.0 15	12.95 104	3.2 1	9.15 34	27.4 16
May 10.7	60.51 36	59.1 14	52.68 32	30.5 15	13.99 104	3.8 6	9.51 36	25.9 15
20.7	60.87 36	60.9 18	53.01 33	28.9 16	15.00 101	5.0 12	9.87 36	24.4 15
	36	23	32	16	96	17	35	13
30.7	61.23	63.2	53.33	27.3	15.96	6.7	10.22	23.1
June 9.7	61.57 34	65.9 27	53.64 31	25.7 16	16.83 87	8.9 22	10.56 34	22.0 11
19.6	61.88 31	68.8 29	53.93 29	24.1 16	17.59 76	11.6 27	10.89 33	21.1 9
29.6	62.15 27	71.9 31	54.20 27	22.7 14	18.22 63	14.7 31	11.19 30	20.4 7
July 9.6	62.38 23	75.2 33	54.44 24	21.5 12	18.70 48	18.0 33	11.45 26	20.0 4
	18	33	20	10	32	35	22	2
19.6	62.56	78.5	54.64	20.5	19.02	21.5	11.67	19.8
29.5	62.69 13	81.8 33	54.80 16	19.6 9	19.17 15	25.2 37	11.85 18	19.8 0
Aug. 8.5	62.77 8	85.0 32	54.91 11	18.9 7	19.15 2	28.9 37	11.98 13	20.1 3
18.5	62.80 3	88.1 31	54.98 7	18.4 5	18.96 19	32.6 37	12.06 8	20.6 5
28.4	62.77 3	91.0 29	55.00 2	18.1 3	18.61 35	36.2 36	12.09 3	21.2 6
	7	26	2	1	50	34	2	8
Sept. 7.4	62.70	93.6	54.98	18.0	18.11	39.6	12.07	22.0
17.4	62.59 11	95.9 23	54.92 6	18.1 1	17.47 64	42.8 32	12.01 6	22.9 9
27.4	62.44 15	97.8 19	54.83 9	18.3 2	16.70 77	45.6 28	11.91 10	23.8 9
Oct. 7.3	62.27 17	99.3 15	54.71 12	18.6 3	15.82 88	48.0 24	11.78 13	24.6 8
17.3	62.08 19	100.4 11	54.58 13	19.0 4	14.86 96	50.0 20	11.63 15	25.4 8
	21	7	14	4	102	15	16	7
27.3	61.87	101.1	54.44	19.4	13.84	51.5	11.47	26.1
Nov. 6.3	61.66 21	101.3 2	54.30 14	19.8 4	12.78 106	52.5 10	11.31 16	26.6 5
16.2	61.46 20	101.1 2	54.17 13	20.3 5	11.72 106	52.9 4	11.16 15	27.0 4
26.2	61.28 18	100.4 7	54.06 11	20.7 4	10.68 104	52.7 2	11.03 13	27.2 2
Dec. 6.2	61.12 16	99.3 11	53.97 9	21.1 4	9.68 100	51.9 8	10.92 11	27.2 0
	13	16	7	4	92	13	8	2
16.1	60.99	97.7	53.90	21.5	8.76	50.6	10.84	27.0
26.1	60.89 10	95.8 19	53.86 4	21.9 4	7.95 81	48.7 19	10.80 4	26.6 4
36.1	60.83 6	93.6 22	53.86 0	22.2 3	7.27 68	46.3 24	10.79 1	26.0 6
Sec δ, Tan δ	1.275	+0.790	1.021	-0.207	4.722	+4.615	1.132	-0.531
Mean Place	59°.725	75''.68	51°.367	27''.91	15°.766	25''.54	7°.953	29''.12
D'ψ a, D _∞ a	-0.01	-0.04	0.00	+0.01	-0.08	-0.22	+0.01	+0.03
Dψ δ, D _∞ δ	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7	+0.3	-0.7

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Pavonis. Mag. 4.3		ζ Capricorni. Mag. 3.9		g Cygni. Mag. 5.3		β Aquarii. Mag. 3.1	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 21 19 s	° ' " -65 45 "	h m 21 21 s	° ' " -22 47 "	h m 21 26 s	° ' " +46 9 "	h m 21 26 s	° ' " - 5 57 "
Jan. 1.1	14.12	57.2	41.12	31.8	12.28	26.8	57.72	24.8
11.1	14.03 9	54.7 25	41.12 0	31.5 3	12.18 10	24.4 24	57.72 0	25.3 5
21.1	14.03 0	51.9 28	41.16 4	31.0 5	12.12 6	21.7 27	57.74 2	25.8 5
31.0	14.11 8	48.9 30	41.23 7	30.4 6	12.11 1	18.9 28	57.80 6	26.2 4
Feb. 10.0	14.28 17	45.8 31	41.33 10	29.6 8	12.15 4	16.1 28	57.89 9	26.5 3
	25	32	13	9	10	28	11	1
20.0	14.53	42.6	41.46	28.7	12.25	13.3	58.00	26.6
Mar. 1.9	14.85 32	39.5 31	41.62 16	27.6 11	12.39 14	10.8 25	58.14 14	26.5 1
11.9	15.24 39	36.5 30	41.82 20	26.4 12	12.58 19	8.6 22	58.32 18	26.2 3
21.9	15.69 45	33.6 29	42.05 23	25.1 13	12.82 24	6.8 18	58.53 21	25.7 5
31.9	16.21 52	30.9 27	42.31 26	23.6 15	13.11 29	5.4 14	58.76 23	24.9 8
	57	24	28	16	33	8	26	10
Apr. 10.8	16.78	28.5	42.59	22.0	13.44	4.6	59.02	23.9
20.8	17.39 61	26.4 21	42.89 30	20.4 16	13.79 35	4.4 2	59.30 28	22.6 13
30.8	18.03 64	24.7 17	43.21 32	18.7 17	14.17 38	4.7 3	59.60 30	21.2 14
May 10.8	18.69 66	23.3 14	43.55 34	17.1 16	14.56 39	5.6 9	59.91 31	19.6 16
20.7	19.36 67	22.3 10	43.90 35	15.5 16	14.95 39	7.0 14	60.23 32	17.9 17
	67	5	34	15	39	20	32	18
30.7	20.03	21.8	44.24	14.0	15.34	9.0	60.55	16.1
June 9.7	20.67 64	21.8 0	44.57 33	12.6 14	15.71 37	11.4 24	60.86 31	14.3 18
19.6	21.28 61	22.2 4	44.89 32	11.4 12	16.05 34	14.1 27	61.16 30	12.5 18
29.6	21.84 56	23.0 8	45.19 30	10.4 10	16.36 31	17.1 30	61.44 28	10.8 17
July 9.6	22.33 49	24.2 12	45.45 26	9.6 8	16.62 26	20.3 32	61.69 25	9.2 16
	42	16	23	5	22	34	21	14
19.6	22.75	25.8	45.68	9.1	16.84	23.7	61.90	7.8
29.5	23.08 33	27.7 19	45.86 18	8.8 3	17.00 16	27.2 35	62.07 17	6.5 13
Aug. 8.5	23.31 23	29.8 21	46.00 14	8.7 1	17.10 10	30.6 34	62.20 13	5.4 11
18.5	23.44 13	32.1 23	46.09 9	8.9 2	17.14 4	33.9 33	62.29 9	4.5 9
28.5	23.47 3	34.5 24	46.13 4	9.3 4	17.13 1	37.0 31	62.33 4	3.9 6
	8	24	0	5	6	30	0	4
Sept. 7.4	23.39	36.9	46.13	9.8	17.07	40.0	62.33	3.5
17.4	23.22 17	39.2 23	46.08 5	10.4 6	16.95 12	42.7 27	62.29 4	3.2 3
27.4	22.97 25	41.3 21	45.99 9	11.1 7	16.79 16	45.0 23	62.21 8	3.1 1
Oct. 7.3	22.65 32	43.1 18	45.88 11	11.8 7	16.60 19	47.0 20	62.11 10	3.2 1
17.3	22.27 38	44.5 14	45.75 13	12.5 7	16.38 22	48.5 15	61.99 12	3.4 2
	41	10	15	7	24	11	13	3
27.3	21.86	45.5	45.60	13.2	16.14	49.6	61.86	3.7
Nov. 6.3	21.44 42	46.0 5	45.45 15	13.8 6	15.89 25	50.2 6	61.73 13	4.1 4
16.2	21.02 42	46.0 0	45.31 14	14.2 4	15.65 24	50.3 1	61.60 13	4.6 5
26.2	20.63 39	45.4 6	45.18 13	14.5 3	15.41 24	49.9 4	61.48 12	5.1 5
Dec. 6.2	20.28 35	44.3 11	45.08 10	14.7 2	15.19 22	49.0 9	61.38 10	5.7 6
	29	15	8	1	19	14	7	6
16.2	19.99	42.8	45.00	14.8	15.00	47.6	61.31	6.3
26.1	19.77 22	40.8 20	44.95 5	14.7 1	14.84 16	45.8 18	61.26 5	6.9 6
36.1	19.63 14	38.4 24	44.93 2	14.4 3	14.71 13	43.5 23	61.23 3	7.5 6
Sec δ, Tan δ	2.436	-2.221	1.085	-0.420	1.443	+1.041	1.005	-0.104
Mean Place	15°.867	38''.69	42°.171	19''.31	14°.290	23''.89	58°.803	16''.06
D _ψ α, D _ω α	+0.04	+0.11	+0.01	+0.02	-0.02	-0.05	0.00	+0.01
D _ψ δ, D _ω δ	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Cephei. Mag. 3.3		ξ Aquarii. Mag. 4.8		74 Cygni. Mag. 5.1		γ Capricorni. Mag. 3.8	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 21 27	° ' +70 10	h m 21 33	° ' - 8 14	h m 21 33	° ' +40 1	h m 21 35	° ' -17 3
	s	"	s	"	s	"	s	"
Jan. 1.1	28.34	49.6	6.27	50.6	25.93	22.3	15.38	31.7
11.1	27.98 36	47.1 25	6.26 1	51.1 5	25.84 9	20.1 22	15.37 1	31.7 0
21.1	27.71 27	44.2 29	6.28 2	51.5 4	25.79 5	17.6 25	15.39 2	31.6 1
31.0	27.55 16	41.1 31	6.33 5	51.7 2	25.79 0	15.0 26	15.44 5	31.3 3
Feb. 10.0	27.51 4	37.9 32	6.41 8	51.8 1	25.83 4	12.4 26	15.52 8	30.9 4
	8	32	11	1	9	25	11	6
20.0	27.59	34.7	6.52	51.7	25.92	9.9	15.63	30.3
Mar. 2.0	27.78 19	31.6 31	6.66 14	51.5 2	26.05 13	7.6 23	15.78 15	29.5 8
11.9	28.09 31	28.8 28	6.83 17	51.1 4	26.22 17	5.6 20	15.96 18	28.5 10
21.9	28.50 41	26.3 25	7.03 20	50.4 7	26.44 22	3.9 17	16.17 21	27.4 11
31.9	29.00 50	24.3 20	7.26 23	49.5 9	26.70 26	2.7 12	16.40 23	26.1 13
	58	14	26	11	30	7	26	14
Apr. 10.8	29.58	22.9	7.52	48.4	27.00	2.0	16.66	24.7
20.8	30.22 64	22.1 8	7.80 28	47.1 13	27.33 33	1.9 1	16.95 29	23.1 16
30.8	30.89 67	21.9 2	8.10 30	45.6 15	27.68 35	2.3 4	17.26 31	21.4 17
May 10.8	31.58 69	22.3 4	8.42 32	43.9 17	28.04 36	3.3 10	17.59 33	19.7 17
20.7	32.27 69	23.4 11	8.74 32	42.2 17	28.41 37	4.8 15	17.92 33	18.0 17
	66	16	32	18	36	19	33	17
30.7	32.93	25.0	9.06	40.4	28.77	6.7	18.25	16.3
June 9.7	33.55 62	27.1 21	9.38 32	38.6 18	29.12 35	9.0 23	18.58 33	14.7 16
19.7	34.11 56	29.7 26	9.68 30	36.9 17	29.45 33	11.7 27	18.90 32	13.2 15
29.6	34.60 49	32.7 30	9.96 28	35.2 17	29.75 30	14.6 29	19.19 29	11.9 13
July 9.6	35.00 40	36.0 33	10.22 26	33.7 15	30.01 26	17.7 31	19.46 27	10.8 11
	30	35	22	13	22	32	23	9
19.6	35.30	39.5	10.44	32.4	30.23	20.9	19.69	9.9
29.5	35.49 19	43.2 37	10.62 18	31.2 12	30.40 17	24.2 33	19.88 19	9.2 7
Aug. 8.5	35.58 9	47.0 38	10.75 13	30.2 10	30.51 11	27.5 33	20.02 14	8.8 4
18.5	35.57 1	50.7 37	10.84 9	29.5 7	30.57 6	30.6 31	20.12 10	8.6 2
28.5	35.45 12	54.4 37	10.89 5	29.0 5	30.58 1	33.6 30	20.17 5	8.6 0
	23	35	0	3	4	28	1	2
Sept. 7.4	35.22	57.9	10.89	28.7	30.54	36.4	20.18	8.8
17.4	34.90 32	61.2 33	10.86 3	28.6 1	30.45 9	38.9 25	20.15 3	9.2 4
27.4	34.50 40	64.1 29	10.79 7	28.6 0	30.32 13	41.0 21	20.08 7	9.6 4
Oct. 7.4	34.03 47	66.7 26	10.70 9	28.8 2	30.16 16	42.8 18	19.98 10	10.1 5
17.3	33.50 53	68.8 21	10.58 12	29.1 3	29.98 18	44.2 14	19.86 12	10.7 6
	57	17	13	4	20	10	13	6
27.3	32.93	70.5	10.45	29.5	29.78	45.2	19.73	11.3
Nov. 6.3	32.33 60	71.6 11	10.32 13	29.9 4	29.57 21	45.7 5	19.59 14	11.9 6
16.2	31.71 62	72.2 6	10.19 13	30.4 5	29.36 21	45.8 1	19.46 13	12.4 5
26.2	31.10 61	72.2 0	10.07 12	30.9 5	29.16 20	45.4 4	19.34 12	12.9 5
Dec. 6.2	30.52 58	71.6 6	9.97 10	31.4 5	28.97 19	44.6 8	19.23 11	13.3 4
	54	12	8	5	16	13	8	2
16.2	29.98	70.4	9.89	31.9	28.81	43.3	19.15	13.5
26.1	29.49 49	68.6 18	9.84 5	32.4 5	28.67 14	41.6 17	19.09 6	13.6 1
36.1	29.08 41	66.3 23	9.81 3	32.9 5	28.56 11	39.5 21	19.06 3	13.7 1
Sec δ , Tan δ	2.949	+2.774	1.010	-0.145	1.306	+0.840	1.046	-0.307
Mean Place	32°.588	43''.11	7°.307	41''.49	27°.678	20''.11	16°.367	20''.57
D' ψ α , D ω α	-0.05	-0.15	0.00	+0.01	-0.01	-0.04	0.00	+0.02
D' ψ δ , D ω δ	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6	+0.3	-0.6

FOR THE UPPER TRANSIT AT WASHINGTON.

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	π^2 Cygni. Mag. 4.3		μ Capricorni. Mag. 5.2		γ Gruis. Mag. 3.2		16 Pegasi. Mag. 5.0	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 21 43 s	° ' +48 54 "	h m 21 48 s	° ' -13 57 "	h m 21 48 s	° ' -37 46 "	h m 21 49 s	° ' +25 30 "
Jan. 1.1	32.63	28.7	32.31	53.1	38.93	44.1	4.83	55.6
11.1	32.49 ¹⁴	26.4 ²³	32.29 ²	53.2 ¹	38.89 ⁴	43.0 ¹¹	4.77 ⁶	53.8 ¹⁸
21.1	32.40 ⁹	23.8 ²⁶	32.29 ⁰	53.2 ⁰	38.89 ⁰	41.7 ¹³	4.74 ³	51.9 ¹⁹
31.0	32.36 ⁴	21.0 ²⁸	32.33 ⁴	53.1 ¹	38.93 ⁴	40.2 ¹⁵	4.75 ¹	49.9 ²⁰
Feb. 10.0	32.37 ¹	18.2 ²⁸	32.40 ⁷	52.8 ³	39.01 ⁸	38.5 ¹⁷	4.79 ⁴	48.0 ¹⁹
20.0	32.44 ⁷	15.4 ²⁸	32.50 ¹⁰	52.4 ⁴	39.13 ¹²	36.6 ¹⁹	4.86 ⁷	46.1 ¹⁹
Mar. 2.0	32.56 ¹²	12.7 ²⁷	32.63 ¹³	52.4 ⁶	39.28 ¹⁵	36.6 ²⁰	4.86 ¹¹	46.1 ¹⁷
11.9	32.56 ¹⁸	12.7 ²⁴	32.63 ¹⁶	51.8 ⁸	39.28 ¹⁹	34.6 ²¹	4.97 ¹⁵	44.4 ¹⁴
21.9	32.74 ²³	10.3 ²⁰	32.79 ¹⁹	51.0 ¹⁰	39.47 ²³	32.5 ²²	5.12 ¹⁹	43.0 ¹⁰
31.9	32.97 ²⁸	8.3 ¹⁵	32.98 ²²	50.0 ¹²	39.70 ²⁶	30.3 ²²	5.31 ²³	42.0 ⁶
10.9	33.25 ³²	6.8 ¹⁰	33.20 ²⁵	48.8 ¹⁴	39.96 ³⁰	28.1 ²²	5.54 ²⁶	41.4 ²
Apr. 20.8	33.57 ³⁶	5.8 ⁵	33.45 ²⁸	47.4 ¹⁵	40.26 ³³	25.9 ²¹	5.80 ²⁸	41.2 ²
30.8	33.93 ³⁹	5.3 ¹	33.73 ³⁰	45.9 ¹⁷	40.59 ³⁵	23.8 ²⁰	6.08 ³¹	41.4 ⁷
May 10.8	34.32 ⁴⁰	5.4 ⁷	34.03 ³²	44.2 ¹⁷	40.94 ³⁷	21.8 ¹⁹	6.39 ³²	42.1 ¹¹
20.7	34.72 ⁴¹	6.1 ¹³	34.35 ³²	42.5 ¹⁸	41.31 ³⁸	19.9 ¹⁷	6.71 ³³	43.2 ¹⁵
30.7	35.13 ⁴¹	7.4 ¹⁷	34.67 ³³	40.7 ¹⁸	41.69 ³⁹	18.2 ¹⁴	7.04 ³³	44.7 ¹⁹
June 9.7	35.54 ⁴⁰	9.1 ²²	35.00 ³³	38.9 ¹⁸	42.08 ³⁹	16.8 ¹²	7.37 ³³	46.6 ²²
19.7	35.94 ³⁷	11.3 ²⁶	35.33 ³²	37.1 ¹⁶	42.47 ³⁸	15.6 ⁹	7.70 ³¹	48.8 ²⁵
29.6	36.31 ³³	13.9 ²⁹	35.65 ³⁰	35.5 ¹⁵	42.85 ³⁵	14.7 ⁶	8.01 ²⁹	51.3 ²⁷
July 9.6	36.64 ²⁹	16.8 ³²	35.95 ²⁷	34.0 ¹³	43.20 ³²	14.1 ³	8.30 ²⁶	54.0 ²⁷
19.6	36.93 ²⁴	20.0 ³⁴	36.22 ²³	32.7 ¹¹	43.52 ²⁸	13.8 ¹	8.56 ²²	56.7 ²⁸
29.6	37.17 ¹⁸	23.4 ³⁵	36.45 ²⁰	31.6 ⁹	43.80 ²³	13.9 ⁴	8.78 ¹⁸	59.5 ²⁸
Aug. 8.5	37.35 ¹³	26.9 ³⁵	36.65 ¹⁶	30.7 ⁷	44.03 ¹⁹	14.3 ⁷	8.96 ¹⁴	62.3 ²⁷
18.5	37.48 ⁷	30.4 ³⁴	36.81 ¹¹	30.0 ⁴	44.22 ¹³	15.0 ¹⁰	9.10 ⁹	65.0 ²⁶
28.5	37.55 ¹	33.8 ³³	36.92 ⁶	29.6 ²	44.35 ⁷	16.0 ¹²	9.19 ⁴	67.6 ²⁴
7.4	37.56 ⁵	37.1 ³¹	36.98 ²	29.4 ⁰	44.42 ²	17.2 ¹³	9.23 ⁰	70.0 ²²
Sept. 17.4	37.51 ¹⁰	40.2 ²⁹	37.00 ²	29.4 ²	44.44 ³	18.5 ¹⁴	9.23 ⁴	72.2 ¹⁹
27.4	37.41 ¹⁵	43.1 ²⁶	36.98 ⁵	29.6 ³	44.41 ⁸	19.9 ¹⁴	9.19 ⁸	74.1 ¹⁷
Oct. 7.4	37.26 ¹⁸	45.7 ²²	36.93 ⁹	29.9 ⁴	44.33 ¹²	21.3 ¹⁴	9.11 ¹⁰	75.8 ¹³
17.3	37.08 ²²	47.9 ¹⁸	36.84 ¹¹	30.3 ⁵	44.21 ¹⁴	22.7 ¹³	9.01 ¹³	77.1 ¹⁰
27.3	36.86 ²⁴	49.7 ¹³	36.73 ¹²	30.8 ⁶	44.07 ¹⁷	24.0 ¹¹	8.88 ¹⁵	78.1 ⁷
Nov. 6.3	36.62 ²⁶	51.0 ⁸	36.61 ¹³	31.4 ⁶	43.90 ¹⁸	25.1 ⁸	8.73 ¹⁶	78.8 ³
16.3	36.36 ²⁶	51.8 ⁴	36.48 ¹³	32.0 ⁵	43.72 ¹⁷	25.9 ⁶	8.57 ¹⁵	79.1 ¹
26.2	36.10 ²⁵	52.2 ¹	36.35 ¹²	32.5 ⁵	43.55 ¹⁷	26.5 ³	8.42 ¹⁵	79.0 ⁴
Dec. 6.2	35.85 ²⁴	52.1 ⁷	36.23 ¹¹	33.0 ⁵	43.38 ¹⁵	26.8 ⁰	8.27 ¹⁴	78.6 ⁷
16.2	35.61 ²²	51.4 ¹²	36.12 ⁹	33.5 ⁴	43.23 ¹²	26.8 ⁴	8.13 ¹²	77.9 ¹¹
26.1	35.39 ¹⁹	50.2 ¹⁷	36.03 ⁶	33.9 ³	43.11 ⁹	26.4 ⁶	8.01 ¹⁰	76.8 ¹⁴
36.1	35.20 ¹⁶	48.5 ²¹	35.97 ⁴	34.2 ²	43.02 ⁶	25.8 ⁹	7.91 ⁷	75.4 ¹⁶
	35.04	46.4	35.93	34.4	42.96	24.9	7.84	73.8
Sec δ , Tan δ	1.522	+1.147	1.030	-0.249	1.265	-0.775	1.108	+0.477
Mean Place	34 ^s .681	24 ^{''} .03	33 ^s .249	42 ^{''} .80	39 ^s .850	28 ^{''} .49	6 ^s .168	55 ^{''} .71
D' ψ α , D ω α	-0.02	-0.06	0.00	+0.01	+0.01	+0.04	-0.01	-0.03
D ψ δ , D ω δ	+0.3	-0.6	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	79 Draconis. Mag. 6.6		ε Indi. Mag. 4.7		20 Pegasi. Mag. 5.7		α Aquarii. Mag. 3.2	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 21 51	° ' +73 17	h m 21 56	° ' -57 8	h m 21 56	° ' +12 41	h m 22 1	° ' - 0 44
	s	"	s	"	s	"	s	"
Jan. 1.1	41.58	34.9	41.65	56.9	49.91	66.8	18.00	40.8
11.1	41.08 50	32.7 22	41.56 9	55.1 18	49.87 4	65.5 13	17.97 3	41.6 8
21.1	40.68 40	30.1 26	41.52 4	52.9 22	49.86 1	64.2 13	17.96 1	42.3 7
31.1	40.40 28	27.1 30	41.54 2	50.4 25	49.87 1	62.8 14	17.98 2	42.9 6
Feb. 10.0	40.26 14	23.9 32	41.62 8	47.7 27	49.91 4	61.5 13	18.03 5	43.4 5
	0	32	14	28	7	12	8	4
20.0	40.26	20.7	41.76	44.9	49.98	60.3	18.11	43.8
Mar. 2.0	40.40 14	17.6 31	41.95 19	42.0 29	50.09 11	59.3 10	18.22 11	44.0 2
11.9	40.67 27	14.6 30	42.20 25	39.1 29	50.23 14	58.6 7	18.36 14	43.9 1
21.9	41.07 40	12.0 26	42.51 31	36.2 29	50.41 18	58.2 4	18.53 17	43.6 3
31.9	41.59 52	9.8 22	42.87 36	33.4 28	50.62 21	58.1 1	18.73 20	43.0 6
	63	17	41	26	24	3	24	9
Apr. 10.9	42.22	8.1	43.28	30.8	50.86	58.4	18.97	42.1
20.8	42.93 71	6.9 12	43.73 45	28.4 24	51.12 26	59.1 7	19.23 26	41.0 11
30.8	43.69 76	6.3 6	44.21 48	26.2 22	51.41 29	60.1 10	19.51 28	39.6 14
May 10.8	44.48 79	6.4 1	44.72 51	24.4 18	51.72 31	61.5 14	19.81 30	38.0 16
20.8	45.28 80	7.1 7	45.25 53	22.9 15	52.04 32	63.2 17	20.13 32	36.2 18
	79	13	54	11	32	19	32	19
30.7	46.07	8.4	45.79	21.8	52.36	65.1	20.45	34.3
June 9.7	46.82 75	10.2 18	46.32 53	21.1 7	52.68 32	67.2 21	20.77 32	32.3 20
19.7	47.51 69	12.5 23	46.84 52	20.8 3	52.99 31	69.5 23	21.08 31	30.3 20
29.6	48.12 61	15.3 28	47.33 49	20.9 1	53.27 28	71.8 23	21.37 29	28.3 20
July 9.6	48.64 52	18.4 31	47.78 45	21.5 6	53.53 26	74.2 24	21.64 27	26.4 19
	41	34	39	10	23	23	23	18
19.6	49.05	21.8	48.17	22.5	53.76	76.5	21.87	24.6
29.6	49.35 30	25.4 36	48.50 33	23.9 14	53.95 19	78.7 22	22.07 20	23.0 16
Aug. 8.5	49.53 18	29.1 37	48.76 26	25.6 17	54.10 15	80.8 21	22.23 16	21.6 14
18.5	49.58 5	32.9 38	48.95 19	27.6 20	54.20 10	82.8 20	22.34 11	20.4 12
28.5	49.51 7	36.7 38	49.06 11	29.8 22	54.26 6	84.6 18	22.41 7	19.4 10
	19	37	3	22	2	15	3	8
Sept. 7.5	49.32	40.4	49.09	32.0	54.28	86.1	22.44	18.6
17.4	49.01 31	43.9 35	49.05 4	34.3 23	54.26 2	87.4 13	22.43 1	18.0 6
27.4	48.60 41	47.1 32	48.94 11	36.5 22	54.20 6	88.5 11	22.38 5	17.6 4
Oct. 7.4	48.10 50	50.0 29	48.76 18	38.5 20	54.11 9	89.3 8	22.31 7	17.5 1
17.3	47.53 57	52.5 25	48.54 22	40.3 18	54.00 11	89.8 5	22.21 10	17.5 0
	64	20	26	15	12	3	12	2
27.3	46.89	54.5	48.28	41.8	53.88	90.1	22.09	17.7
Nov. 6.3	46.20 69	56.1 16	48.00 28	42.9 11	53.75 13	90.1 0	21.97 12	18.0 3
16.3	45.49 71	57.1 10	47.72 28	43.5 6	53.62 13	89.9 2	21.85 12	18.4 4
26.2	44.77 72	57.5 4	47.45 27	43.7 2	53.49 13	89.4 5	21.73 12	18.9 5
Dec. 6.2	44.06 71	57.3 2	47.20 25	43.4 3	53.38 11	88.7 7	21.62 11	19.5 6
	68	8	22	8	10	9	9	7
16.2	43.38	56.5	46.98	42.6	53.28	87.8	21.53	20.2
26.2	42.75 63	55.1 14	46.80 18	41.3 13	53.20 8	86.7 11	21.46 7	20.9 7
36.1	42.19 56	53.1 20	46.67 13	39.6 17	53.14 6	85.5 12	21.41 5	21.7 8
Sec δ, Tan δ	3.478	+3.331	1.843	-1.549	1.025	+0.225	1.000	-0.013
Mean Place	46°.372	25''.97	42°.665	38''.19	51°.027	69''.86	18°.967	34''.29
D'ψ α, Dα α	-0.05	-0.19	+0.02	+0.09	0.00	-0.01	0.00	0.00
Dψ δ, Dα δ	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Aquarii. Mag. 4.4		♄ Cephei. Mag. 5.4		♊ Gruls. Mag. 2.2		♓ Pegasi. Mag. 4.0	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 22 I s	° ' -14 17 "	h m 22 2 s	° ' +62 21 "	h m 22 2 s	° ' -47 22 "	h m 22 2 s	° ' +24 54 "
Jan. 1.1	43.52	42.1	18.96	47.6	44.44	76.1	56.34	71.7
11.1	43.49 3	42.2 1	18.69 27	45.5 21	44.37 7	74.6 15	56.28 6	70.0 17
21.1	43.49 0	42.2 0	18.48 21	42.9 26	44.34 3	72.8 18	56.24 4	68.2 18
31.1	43.51 2	42.1 1	18.34 14	40.0 29	44.35 1	70.8 20	56.23 1	66.3 19
Feb. 10.0	43.56 5 8	41.8 3 5	18.27 7 1	37.0 30 31	44.41 6 10	68.5 23 24	56.26 3 6	64.4 19 18
20.0	43.64 12	41.3 7	18.28 9	33.9 30	44.51 15	66.1 25	56.32 10	62.6 16
Mar. 2.0	43.76 15	40.6 9	18.37 18	30.9 28	44.66 19	63.6 26	56.42 14	61.0 14
11.9	43.91 18	39.7 11	18.55 26	28.1 25	44.85 24	61.0 27	56.56 17	59.6 11
21.9	44.09 21	38.6 12	18.81 34	25.6 21	45.09 28	58.3 26	56.73 21	58.5 7
31.9	44.30 24	37.4 14	19.15 40	23.5 16	45.37 32	55.7 25	56.94 24	57.8 2
Apr. 10.9	44.54 27	36.0 16	19.55 46	21.9 10	45.69 36	53.2 24	57.18 28	57.6 2
20.8	44.81 29	34.4 17	20.01 50	20.9 4	46.05 39	50.8 23	57.46 30	57.8 6
30.8	45.10 31	32.7 18	20.51 52	20.5 2	46.44 41	48.5 20	57.76 32	58.4 11
May 10.8	45.41 33	30.9 19	21.03 54	20.7 8	46.85 43	46.5 17	58.08 33	59.5 15
20.8	45.74 33	29.0 18	21.57 54	21.5 13	47.28 44	44.8 14	58.41 34	61.0 19
30.7	46.07 33	27.2 18	22.11 52	22.8 19	47.72 44	43.4 11	58.75 33	62.9 21
June 9.7	46.40 32	25.4 17	22.63 49	24.7 24	48.16 42	42.3 8	59.08 32	65.0 24
19.7	46.72 30	23.7 15	23.12 44	27.1 28	48.58 40	41.5 3	59.40 30	67.4 26
29.6	47.02 28	22.2 14	23.56 39	29.9 31	48.98 37	41.2 1	59.70 27	70.0 27
July 9.6	47.30 25	20.8 12	23.95 32	33.0 34	49.35 33	41.3 5	59.97 24	72.7 28
19.6	47.55 21	19.6 9	24.27 25	36.4 36	49.68 28	41.8 8	60.21 19	75.5 27
29.6	47.76 16	18.7 7	24.52 18	40.0 36	49.96 22	42.6 11	60.40 15	78.2 27
Aug. 8.5	47.92 12	18.0 4	24.70 9	43.6 37	50.18 16	43.7 14	60.55 11	80.9 26
18.5	48.04 8	17.6 2	24.79 1	47.3 37	50.34 10	45.1 16	60.66 6	83.5 24
28.5	48.12 4	17.4 0	24.80 6	51.0 36	50.44 4	46.7 18	60.72 2	85.9 22
Sept. 7.5	48.16 1	17.4 2	24.74 13	54.6 33	50.48 3	48.5 19	60.74 3	88.1 19
17.4	48.15 5	17.6 4	24.61 20	57.9 31	50.45 8	50.4 19	60.71 6	90.0 17
27.4	48.10 8	18.0 5	24.41 26	61.0 28	50.37 13	52.3 18	60.65 9	91.7 14
Oct. 7.4	48.02 10	18.5 5	24.15 31	63.8 24	50.24 17	54.1 16	60.56 12	93.1 11
17.3	47.92 12	19.0 6	23.84 35	66.2 19	50.07 20	55.7 13	60.44 14	94.2 7
27.3	47.80 12	19.6 6	23.49 38	68.1 14	49.87 22	57.0 10	60.30 15	94.9 4
Nov. 6.3	47.68 13	20.2 6	23.11 40	69.5 9	49.65 22	58.0 7	60.15 15	95.3 1
16.3	47.55 12	20.8 5	22.71 40	70.4 3	49.43 21	58.7 3	60.00 14	95.4 3
26.2	47.43 11	21.3 5	22.31 39	70.7 2	49.22 19	59.0 1	59.86 12	95.1 7
Dec. 6.2	47.32 9	21.8 4	21.92 38	70.5 8	49.03 17	58.9 5	59.72 12	94.4 10
16.2	47.23 7	22.2 3	21.54 35	69.7 14	48.86 14	58.4 9	59.60 10	93.4 13
26.2	47.16 5	22.5 2	21.19 30	68.3 19	48.72 10	57.5 12	59.50 .8	92.1 15
36.1	47.11	22.7	20.89	66.4	48.62	56.3	59.42	90.6
Sec δ, Tan δ	1.032	-0.255	2.156	+1.910	1.476	-1.087	1.103	+0.465
Mean Place	44°.392	31''.91	21°.830	39''.12	45°.301	58''.67	57°.611	71''.15
D'ψ a, Dω a	0.00	+0.01	-0.02	-0.11	+0.01	+0.06	-0.01	-0.03
Dψ δ, Dω δ	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5	+0.3	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Pegasi. Mag. 3.7		π Pegasi. Mag. 4.4		ζ Cephei. Mag. 3.6		α Cephei. Mag. 5.0	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 22 5 s	° ' + 5 46 "	h m 22 6 s	° ' +32 44 "	h m 22 7 s	° ' +57 46 "	h m 22 8 s	° ' +71 54 "
Jan. 1.1	47.70	5.7 10	5.93	66.1 18	47.62	28.0 21	3.99	55.0 20
11.1	47.66 4	4.7 10	5.84 9	64.3 21	47.40 22	25.9 25	3.51 48	53.0 25
21.1	47.64 2	3.7 10	5.78 6	62.2 22	47.22 18	23.4 28	3.11 40	50.5 29
31.1	47.65 1	2.7 10	5.76 2	60.0 22	47.10 12	20.6 29	2.82 29	47.6 31
Feb. 10.0	47.69 4	1.8 9	5.78 2	57.8 21	47.05 5	17.7 30	2.65 17	44.5 32
	7	8	5		1		4	
20.0	47.76	1.0 5	5.83	55.7 20	47.06	14.7 29	2.61 8	41.3 31
Mar. 2.0	47.86 10	0.5 3	5.92 9	53.7 18	47.14 8	11.8 27	2.69 21	38.2 30
12.0	48.00 14	0.2 0	6.05 13	51.9 14	47.30 16	9.1 24	2.90 34	35.2 27
21.9	48.17 17	0.2 2	6.23 18	49.4 11	47.53 23	6.7 20	3.24 45	30.2 23
31.9	48.37 20	0.4 6	6.45 22	48.8 6	47.83 30	4.7 15	3.69 55	28.3 13
	23		25		35			
Apr. 10.9	48.60	1.0 9	6.70	48.7 1	48.18	3.2 9	4.24 63	27.0 7
20.8	48.86 26	3.1 12	6.99 29	49.1 4	48.58 40	1.9 2	5.57 74	26.2 1
30.8	49.14 28	4.6 15	7.30 31	50.0 9	49.02 44	2.9 8	6.31 76	26.7 5
May 10.8	49.44 30	8.3 20	7.64 34	53.1 21	49.49 47	4.3 19	7.82 72	27.8 17
20.8	49.75 31	10.3 21	7.99 35	55.2 24	49.98 49	6.2 24	8.54 68	29.5 22
	32	19	35		48		75	
30.7	50.07	12.4 22	8.34	57.6 27	50.46	8.6 27	9.22 61	31.7 26
June 9.7	50.39 32	14.6 22	8.69 35	60.3 29	50.93 47	11.3 31	9.83 53	34.3 30
19.7	50.70 31	16.8 21	9.02 33	63.2 30	51.38 45	14.4 34	10.36 44	37.3 33
29.7	50.99 29	18.9 19	9.33 31	66.2 30	51.79 41	17.8 35	10.80 34	40.6 36
July 9.6	51.26 27	20.8 18	9.61 28	69.2 30	52.15 36	21.3 36	11.14 22	44.2 37
	24	16	24		31			
19.6	51.50	22.6 16	9.85	72.2 29	52.46	24.9 37	11.36 11	47.9 38
29.6	51.70 20	24.2 14	10.05 20	75.1 27	52.70 24	28.6 36	11.47 1	51.7 38
Aug. 8.5	51.86 16	25.6 12	10.20 15	77.8 26	52.87 17	32.2 34	11.46 11	55.5 37
18.5	51.98 12	26.8 9	10.31 11	80.4 24	52.98 11	35.6 33	11.35 22	59.2 36
28.5	52.05 7	27.7 7	10.37 6	82.8 21	53.02 4	38.9 30	11.13 32	62.8 33
	3	28.4 5	1		3			
Sept. 7.5	52.08	28.9 2	10.38	84.9 17	52.99	41.9 27	10.81 41	66.1 30
17.4	52.07 1	29.1 1	10.35 3	86.6 14	52.73 16	44.6 23	10.40 48	69.1 27
27.4	52.03 4	29.2 1	10.28 7	88.0 10	52.52 21	46.9 18	9.92 55	71.8 22
Oct. 7.4	51.96 7	29.2 1	10.17 11	89.0 7	52.27 25	48.7 14	9.37 60	74.0 18
17.3	51.86 10	29.1 3	10.04 13	89.7 2	52.27 28	50.1 9	8.77 63	75.8 12
	12	28.8 5	15					
27.3	51.74 12	28.3 7	9.89 16	89.9 2	51.99 31	51.3 3	8.14 65	77.0 6
Nov. 6.3	51.62 12	27.6 8	9.73 17	89.7 6	51.68 33	51.0 8	7.49 65	77.6 0
16.3	51.50 12	26.8 9	9.56 17	88.1 13	51.35 33	50.2 13	6.21 59	77.0 12
26.2	51.38 12	25.9 9	9.39 17	86.8 17	51.02 33	48.9 19	5.62 52	75.8 18
Dec. 6.2	51.27 11	25.0 9	9.23 16	85.1 17	50.69 33	47.0 19	5.10 52	74.0 18
	9		15		31			
16.2	51.18 8		9.08		50.38			
26.2	51.10 6		8.96 12		50.10 28			
36.1	51.04		8.86 10		49.85 25			
Sec δ , Tan δ	1.005	+0.101	1.189	+0.643	1.875	+1.587	3.220	+3.062
Mean Place	48°.698	10''.25	7°.346	63''.43	50°.053	19''.83	8°.254	44''.78
D' δ α , D α α	0.00	-0.01	-0.01	-0.04	-0.02	-0.09	-0.04	-0.18
D δ δ , D α δ	+0.3	-0.5	+0.3	-0.5	+0.4	-0.5	+0.4	-0.5

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	θ Aquarii. Mag. 4.3			α Tucanse. Mag. 2.9			γ Aquarii. Mag. 4.0			δ Pegasi. Mag. 4.9		
	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion S.	Right Ascension.		Declina- tion N.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	22	12	— 8 12	22	12	—60 41	22	17	— 1 49	22	17	+11 45
	s		"	s		"	s		"	s		"
Jan. 1.1	13.77		68.9	32.06		55.9	8.91		39.9	13.13		56.8
11.1	13.73	4	69.3	31.90	16	53.9	8.87	4	40.6	13.08	5	55.6
21.1	13.72	1	69.6	31.80	10	51.6	8.85	2	41.2	13.05	3	54.4
31.1	13.73	1	69.8	31.77	3	48.9	8.85	0	41.7	13.05	0	53.2
Feb. 10.0	13.77	4	69.8	31.80	3	46.0	8.88	3	42.1	13.07	2	52.0
		7			9	31		6			5	
20.0	13.84		69.7	31.89		42.9	8.94		42.4	13.12		50.9
Mar. 2.0	13.94	10	69.4	32.05	16	39.8	9.03	9	42.5	13.21	9	50.0
12.0	14.07	13	68.9	32.28	23	36.6	9.16	13	42.3	13.33	12	49.3
21.9	14.23	16	68.1	32.57	29	33.4	9.32	16	41.9	13.49	16	48.9
31.9	14.43	20	67.1	32.91	34	30.3	9.51	19	41.2	13.68	19	48.9
		23			40	29		22			22	
Apr. 10.9	14.66		65.9	33.31		27.4	9.73		40.3	13.90		49.2
20.8	14.92	26	64.5	33.76	45	24.7	9.98	25	39.1	14.15	25	49.9
30.8	15.20	28	62.9	34.25	49	22.3	10.26	28	37.7	14.43	28	50.9
May 10.8	15.50	30	61.1	34.78	53	20.2	10.56	30	36.1	14.73	30	52.2
20.8	15.82	32	59.3	35.33	55	18.5	10.88	32	34.3	15.05	32	53.8
		33			57	13		32			32	
30.7	16.15		57.4	35.90		17.2	11.20		32.4	15.37		55.7
June 9.7	16.47	32	55.5	36.47	57	16.3	11.52	32	30.4	15.69	32	57.8
19.7	16.79	32	53.6	37.02	55	15.9	11.83	31	28.4	16.01	32	60.0
29.7	17.09	30	51.8	37.54	52	15.9	12.13	30	26.4	16.31	30	62.3
July 9.6	17.37	28	50.2	38.03	49	16.4	12.41	28	24.5	16.58	27	64.7
		25			43	10		25			24	
19.6	17.62		48.7	38.46		17.4	12.66		22.7	16.82		67.0
29.6	17.83	21	47.4	38.83	37	18.7	12.87	21	21.1	17.03	21	69.2
Aug. 8.5	18.00	17	46.4	39.13	30	20.4	13.04	17	19.7	17.20	17	71.3
18.5	18.13	13	45.6	39.34	21	22.4	13.17	13	18.5	17.33	13	73.2
28.5	18.22	9	45.0	39.46	12	24.6	13.26	9	17.5	17.41	8	75.0
		4			4	24		4			4	
Sept. 7.5	18.26		44.6	39.50		27.0	13.30		16.8	17.45		76.6
17.4	18.26	0	44.5	39.46	4	29.4	13.30	0	16.3	17.45	0	77.9
27.4	18.23	3	44.5	39.34	12	31.7	13.27	3	16.0	17.41	4	78.9
Oct. 7.4	18.16	7	44.7	39.15	19	33.8	13.21	6	15.9	17.34	7	79.7
17.4	18.07	9	45.1	38.90	25	35.7	13.12	9	15.9	17.25	9	80.2
		11			30	16		10			11	
27.3	17.96		45.5	38.60		37.3	13.02		16.1	17.14		80.5
Nov. 6.3	17.84	12	46.0	38.28	32	38.5	12.91	11	16.4	17.02	12	80.6
16.3	17.72	12	46.5	37.95	33	39.2	12.79	12	16.9	16.89	13	80.4
26.2	17.60	12	47.1	37.62	33	39.4	12.67	12	17.5	16.77	12	80.0
Dec. 6.2	17.49	11	47.7	37.30	32	39.1	12.56	11	18.1	16.65	12	79.4
		9			29	8		9			10	
16.2	17.40		48.2	37.01		38.3	12.47		18.7	16.55		78.6
26.2	17.33	7	48.7	36.77	24	37.0	12.39	8	19.4	16.46	9	77.6
36.1	17.27	6	49.1	36.58	19	35.3	12.33	6	20.0	16.39	7	76.5
Sec δ , Tan δ	1.010		—0.144	2.043		—1.781	1.000		—0.032	1.021		+0.208
Mean Place	14°.626		60'' .55	32°.956		36'' .46	9°.789		33'' .54	14°.148		59'' .21
D' ψ α , D ω α	0.00		+0.01	+0.02		+0.11	0.00		0.00	0.00		—0.01
D' ψ δ , D ω δ	+0.4		—0.5	+0.4		—0.5	+0.4		—0.4	+0.4		—0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Lacertæ. Mag. 4.6		π Aquarii. Mag. 4.6		σ Aquarii. Mag. 4.9		α Lacertæ. Mag. 3.8	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 22 20	° ' +51 47	h m 22 20	° ' + 0 55	h m 22 26	° ' -11 7	h m 22 27	° ' +49 49
	s	"	s	"	s	"	s	"
Jan. 1.2	6.22	42.4	49.15	62.4	1.92	33.1	40.48	73.7
11.1	6.04 18	40.4 20	49.10 5	61.7 7	1.87 5	33.4 3	40.30 18	71.8 19
21.1	5.89 15	38.1 23	49.07 3	61.0 7	1.84 3	33.6 2	40.16 14	69.6 22
31.1	5.79 10	35.5 26	49.07 0	60.3 7	1.84 0	33.6 0	40.06 10	67.1 25
Feb. 10.0	5.74 5	32.7 28	49.10 3	59.7 6	1.87 3	33.4 2	40.01 5	64.4 27
	1	28	6	4	5	3	0	27
20.0	5.75	29.9	49.16	59.3	1.92	33.1	40.01	61.7
Mar. 2.0	5.82 7	27.2 27	49.25 9	59.0 3	2.01 9	32.6 5	40.07 6	59.0 27
12.0	5.95 13	24.7 25	49.37 12	59.0 0	2.13 12	31.9 7	40.19 12	56.5 25
21.9	6.14 19	22.4 23	49.52 15	59.3 3	2.28 15	30.9 10	40.36 17	54.3 22
31.9	6.39 25	20.5 19	49.71 19	59.8 5	2.47 19	29.7 12	40.59 23	52.5 18
	30	14	22	8	22	14	29	14
Apr. 10.9	6.69	19.1	49.93	60.6	2.69	28.3	40.88	51.1
20.9	7.04 35	18.2 9	50.18 25	61.7 11	2.94 25	26.8 15	41.21 33	50.2 9
30.8	7.43 39	17.9 3	50.45 27	63.0 13	3.21 27	25.1 17	41.58 37	49.9 3
May 10.8	7.84 41	18.2 3	50.75 30	64.6 16	3.51 30	23.3 18	41.98 40	50.1 2
20.8	8.27 43	19.0 8	51.06 31	66.4 18	3.83 32	21.4 19	42.40 42	50.9 8
	44	13	32	19	33	20	43	13
30.7	8.71	20.3	51.38	68.3	4.16	19.4	42.83	52.2
June 9.7	9.14 43	22.1 18	51.70 32	70.3 20	4.49 33	17.5 19	43.25 42	54.0 18
19.7	9.55 41	24.4 23	52.02 32	72.4 21	4.81 32	15.6 19	43.65 40	56.3 23
29.7	9.93 38	27.1 27	52.32 30	74.4 20	5.12 31	13.9 17	44.03 38	58.9 26
July 9.6	10.28 35	30.1 30	52.59 27	76.4 20	5.41 29	12.3 16	44.38 35	61.8 29
	30	32	25	19	26	14	30	32
19.6	10.58	33.3	52.84	78.3	5.67	10.9	44.68	65.0
29.6	10.82 24	36.7 34	53.06 22	80.0 17	5.89 22	9.7 12	44.93 25	68.4 34
Aug. 8.6	11.01 19	40.2 35	53.23 17	81.6 16	6.08 19	8.8 9	45.12 19	71.9 35
18.5	11.14 13	43.7 35	53.36 13	83.0 14	6.23 15	8.1 7	45.26 14	75.3 34
28.5	11.20 6	47.2 35	53.45 9	84.1 11	6.33 10	7.7 4	45.34 8	78.7 34
	0	34	5	9	5	2	2	33
Sept. 7.5	11.20	50.6	53.50	85.0	6.38	7.5	45.36	82.0
17.4	11.15 5	53.7 31	53.51 1	85.7 7	6.39 1	7.5 0	45.33 3	85.1 31
27.4	11.05 10	56.6 29	53.48 3	86.2 5	6.37 2	7.7 2	45.25 8	88.0 29
Oct. 7.4	10.90 15	59.2 26	53.42 6	86.4 2	6.31 6	8.1 4	45.12 13	90.6 26
17.4	10.71 19	61.4 22	53.33 9	86.5 1	6.23 8	8.6 5	44.95 17	92.8 22
	22	18	10	1	10	6	20	18
27.3	10.49	63.2	53.23	86.4	6.13	9.2	44.75	94.6
Nov. 6.3	10.25 24	64.5 13	53.12 11	86.1 3	6.02 11	9.8 6	44.53 22	95.9 13
16.3	9.99 26	65.4 9	53.00 12	85.7 4	5.90 12	10.4 6	44.29 24	96.8 9
26.3	9.72 27	65.7 3	52.88 12	85.2 5	5.78 12	11.0 6	44.04 25	97.2 4
Dec. 6.2	9.46 26	65.5 2	52.77 11	84.6 6	5.67 11	11.5 5	43.80 24	97.1 1
	25	7	9	7	10	5	23	7
16.2	9.21	64.8	52.68	83.9	5.57	12.0	43.57	96.4
26.2	8.98 23	63.5 13	52.60 8	83.2 7	5.49 8	12.4 4	43.35 22	95.2 12
36.1	8.78 20	61.8 17	52.54 6	82.4 8	5.42 7	12.8 4	43.15 20	93.6 16
Sec δ, Tan δ	1.617	+1.271	1.000	+0.016	1.019	-0.197	1.550	+1.185
Mean Place	8°.213	34'' .42	50°.036	67'' .89	2°.682	24'' .32	42°.328	65'' .60
D' α, D α	-0.01	-0.08	0.00	0.00	0.00	+0.01	-0.01	-0.07
D δ, D α δ	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♊ Aquarii. Mag. 5.3		226 B. Cephei. Mag. 5.7		♊ Aquarii. Mag. 4.1		10 Lacertæ. Mag. 4.9	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 22 29 s	° ' -21 8 "	h m 22 30 s	° ' +75 46 "	h m 22 30 s	° ' - 0 33 "	h m 22 35 s	° ' +38 35 "
Jan. 1.2	55.47	87.1	39.90	53.3	52.35	63.8	19.94	55.7
11.1	55.42 5	86.9 2	39.22 68	51.5 18	52.29 6	64.5 7	19.81 13	54.0 17
21.1	55.39 3	86.6 3	38.63 59	49.3 22	52.26 3	65.2 7	19.71 10	52.0 20
31.1	55.39 0	86.1 5	38.16 47	46.7 26	52.25 1	65.8 6	19.64 7	49.8 22
Feb. 10.0	55.41 2	85.3 8	37.84 32	43.8 29	52.27 2	66.3 5	19.61 3	47.5 23
	5	10	16	31	5	3	1	23
20.0	55.46	84.3	37.68	40.7	52.32	66.6	19.62	45.2
Mar. 2.0	55.55 9	83.2 11	37.68 0	37.5 32	52.40 8	66.7 1	19.68 6	42.9 23
12.0	55.67 12	81.9 13	37.85 17	34.4 31	52.51 11	66.6 1	19.78 10	40.8 21
21.9	55.83 16	80.4 15	38.18 33	31.5 29	52.66 15	66.3 3	19.93 15	39.1 17
31.9	56.02 19	78.7 17	38.66 48	29.0 25	52.84 18	65.7 6	20.13 20	37.7 14
	22	18	62	21	21	9	24	10
Apr. 10.9	56.24	76.9	39.28	26.9	53.05	64.8	20.37	36.7
20.9	56.50 26	75.0 19	40.02 74	25.3 16	53.29 24	63.6 12	20.65 28	36.2 5
30.8	56.79 29	73.0 20	40.85 83	24.2 11	53.56 27	62.2 14	20.97 32	36.2 0
May 10.8	57.10 31	70.9 21	41.74 89	23.7 5	53.85 29	60.6 16	21.32 35	36.7 5
20.8	57.42 32	68.9 20	42.66 92	23.8 1	54.16 31	58.8 18	21.68 36	37.7 10
	34	19	93	7	32	19	37	14
30.7	57.76	67.0	43.59	24.5	54.48	56.9	22.05	39.1
June 9.7	58.11 35	65.2 18	44.50 91	25.8 13	54.80 32	54.9 20	22.42 37	41.0 19
19.7	58.45 34	63.5 17	45.37 87	27.7 19	55.12 32	52.8 21	22.78 36	43.3 23
29.7	58.77 32	62.0 15	46.17 80	30.1 24	55.43 31	50.8 20	23.12 34	45.9 26
July 9.6	59.07 30	60.8 12	46.88 71	32.9 28	55.71 28	48.8 20	23.44 32	48.7 28
	28	9	60	31	25	18	28	30
19.6	59.35	59.9	47.48	36.0	55.96	47.0	23.72	51.7
29.6	59.59 24	59.2 7	47.96 48	39.4 34	56.18 22	45.3 17	23.96 24	54.8 31
Aug. 8.6	59.79 20	58.8 4	48.31 35	43.1 37	56.37 19	43.8 15	24.15 19	57.9 31
18.5	59.95 16	58.7 1	48.52 21	46.9 38	56.51 14	42.5 13	24.30 15	61.0 31
28.5	60.06 11	58.8 1	48.59 7	50.7 38	56.61 10	41.4 11	24.39 9	64.0 30
	6	4	6	38	6	8	4	29
Sept. 7.5	60.12	59.2	48.53	54.5	56.67	40.6	24.43	66.9
17.4	60.14 2	59.8 6	48.33 20	58.2 37	56.69 2	40.0 6	24.43 0	69.6 27
27.4	60.12 2	60.6 8	48.00 33	61.7 35	56.67 2	39.6 4	24.38 5	72.1 25
Oct. 7.4	60.06 6	61.5 9	47.55 45	65.0 33	56.62 5	39.4 2	24.30 8	74.3 22
17.4	59.97 9	62.4 9	47.00 55	68.0 30	56.54 8	39.4 0	24.18 12	76.1 18
	11	9	64	26	10	2	14	14
27.3	59.86	63.3	46.36	70.6	56.44	39.6	24.04	77.5
Nov. 6.3	59.74 12	64.2 9	45.64 72	72.7 21	56.33 11	39.9 3	23.88 16	78.6 11
16.3	59.61 13	65.0 8	44.86 78	74.3 16	56.22 11	40.3 4	23.71 17	79.3 7
26.3	59.48 13	65.6 6	44.04 82	75.4 11	56.11 11	40.8 5	23.53 18	79.5 2
Dec. 6.2	59.36 12	66.1 5	43.20 84	75.8 4	56.00 11	41.4 6	23.35 18	79.2 3
	10	3	83	2	10	7	17	7
16.2	59.26	66.4	42.37	75.6	55.90	42.1	23.18	78.5
26.2	59.17 9	66.6 2	41.58 79	74.8 8	55.82 8	42.8 7	23.02 16	77.4 11
36.1	59.10 7	66.6 0	40.85 73	73.4 14	55.75 7	43.5 7	22.88 14	75.9 15
Sec δ, Tan δ	1.072	-0.387	4.071	+3.947	1.000	-0.010	1.279	+0.798
Mean Place	56°.159	75''.56	44°.973	40''.83	53°.171	58''.29	21°.347	49''.70
D' δ a, D_ δ a	0.00	+0.02	-0.04	-0.24	0.00	0.00	-0.01	-0.05
D_ δ, D_ δ	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4	+0.4	-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ε Piscis Australis. Mag. 4.2			ζ Pegasi. Mag. 3.6			β Octantis. Mag. 4.3			β Gruis. Mag. 2.2		
	Right Ascension.		Declination S.	Right Ascension.		Declination N.	Right Ascension.		Declination S.	Right Ascension.		Declination S.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	22	35	-27 29	22	37	+10 22	22	37	-81 49	22	37	-47 20
	s		"	s		"	s		"	s		"
Jan. 1.2	50.13		65.4	6.46		34.7	12.32		98.6	28.09		41.5
11.1	50.06	7	65.0 4	6.39	7	33.7 10	11.37	95	96.1 25	27.98	11	40.2 13
21.1	50.02	4	64.3 7	6.34	5	32.6 11	10.63	74	93.1 30	27.90	8	38.6 16
31.1	50.01	1	63.4 9	6.32	2	31.5 11	10.11	52	89.8 33	27.86	4	36.7 19
Feb. 10.1	50.03	2	62.3 11	6.33	1	30.4 11	9.82	29	86.2 36	27.86	0	34.5 22
		5	13		4	10		5	37		5	25
20.0	50.08		61.0	6.37		29.4	9.77		82.5	27.91		32.0
Mar. 2.0	50.16	8	59.5 15	6.44	7	28.6 8	9.96	19	78.7 38	28.00	9	29.4 26
12.0	50.28	12	57.8 17	6.54	10	28.1 5	10.39	43	74.9 38	28.14	14	26.7 27
21.9	50.44	16	55.9 19	6.68	14	27.8 3	11.04	65	71.1 38	28.33	19	23.9 28
31.9	50.63	19	53.9 20	6.85	17	27.8 0	11.90	86	67.5 36	28.56	23	21.0 29
		23	21		21	4		106	33		27	28
Apr. 10.9	50.86		51.8	7.06		28.2	12.96		64.2	28.83		18.2
20.9	51.12	26	49.6 22	7.30	24	28.9 7	14.19	123	61.2 30	29.15	32	15.5 27
30.8	51.41	29	47.4 22	7.57	27	29.9 10	15.57	138	58.6 26	29.51	36	12.9 26
May 10.8	51.73	32	45.3 21	7.86	29	31.2 13	17.07	150	56.4 22	29.89	38	10.5 24
20.8	52.07	34	43.2 21	8.17	31	32.8 16	18.66	159	54.6 18	30.30	41	8.4 21
		35	20		32	18		165	13		43	18
30.8	52.42		41.2	8.49		34.6	20.31		53.3	30.73		6.6
June 9.7	52.77	35	39.4 18	8.82	33	36.6 20	21.98	167	52.6 7	31.17	44	5.1 15
19.7	53.12	35	37.8 16	9.14	32	38.8 22	23.62	164	52.4 2	31.60	43	4.0 11
29.7	53.46	34	36.5 13	9.44	30	41.1 23	25.20	158	52.8 4	32.02	42	3.3 7
July 9.6	53.78	32	35.5 10	9.72	28	43.4 23	26.68	148	53.7 9	32.41	39	3.0 3
		29	7		26	22		133	14		36	2
19.6	54.07		34.8	9.98		45.6	28.01		55.1	32.77		3.2
29.6	54.33	26	34.4 4	10.21	23	47.8 22	29.16	115	57.0 19	33.08	31	3.8 6
Aug. 8.6	54.54	21	34.3 1	10.40	19	49.9 21	30.09	93	59.2 22	33.34	26	4.7 9
18.5	54.71	17	34.6 3	10.54	14	51.8 19	30.78	69	61.7 25	33.55	21	6.0 13
28.5	54.83	12	35.1 5	10.64	10	53.5 17	31.20	42	64.5 28	33.69	14	7.6 16
		7	8		6	15		13	29		8	18
Sept. 7.5	54.90		35.9	10.70		55.0	31.33		67.4	33.77		9.4
17.5	54.92	2	36.8 9	10.72	2	56.2 12	31.17	16	70.3 29	33.79	2	11.3 19
27.4	54.90	2	37.9 11	10.71	1	57.2 10	30.74	43	73.1 28	33.75	4	13.3 20
Oct. 7.4	54.84	6	39.1 12	10.66	5	58.0 8	30.05	69	75.7 26	33.66	9	15.3 20
17.4	54.75	9	40.3 12	10.58	8	58.5 5	29.13	92	78.0 23	33.52	14	17.1 18
		11	11		9	3		112	19		17	16
27.3	54.64		41.4	10.49		58.8	28.01		79.9	33.35		18.7
Nov. 6.3	54.51	13	42.4 10	10.38	11	58.9 1	26.74	127	81.3 14	33.15	20	20.1 14
16.3	54.37	14	43.3 9	10.26	12	58.8 1	25.38	136	82.1 8	32.94	21	21.1 10
26.3	54.23	14	44.0 7	10.14	12	58.4 4	23.97	141	82.3 2	32.73	21	21.8 7
Dec. 6.2	54.10	13	44.5 5	10.03	11	57.8 6	22.57	140	81.8 5	32.53	20	22.0 2
		12	2		10	7		133	11		19	2
16.2	53.98		44.7	9.93		57.1	21.24		80.7	32.34		21.8
26.2	53.88	10	44.7 0	9.84	9	56.2 9	20.02	122	79.0 17	32.17	17	21.2 6
36.2	53.80	8	44.5 2	9.76	8	55.2 10	18.95	107	76.8 22	32.04	13	20.2 10
Sec δ, Tan δ	1.127		-0.521	1.017		+0.183	7.042		-6.972	1.476		-1.085
Mean Place	50°.755		52'' .31	7°.360		36'' .72	13°.726		77'' .38	28°.656		23'' .92
D'φ a, Dω a	0.00		+0.03	0.00		-0.01	+0.07		+0.44	+0.01		+0.07
Dφ δ, Dω δ	+0.4		-0.4	+0.4		-0.4	+0.4		-0.4	+0.4		-0.4

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	η Pegasi. Mag. 3.1		λ Pegasi. Mag. 4.1		ε Grus. Mag. 3.7		γ Aquarii. Mag. 4.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 22 38 s	° ' " +29 45 "	h m 22 42 s	° ' " +23 6 "	h m 22 43 s	° ' " -51 46 "	h m 22 44 s	° ' " -14 2 "
Jan. 1.2	54.14	60.8	19.29	29.3	17.77	46.7	58.59	76.4
11.1	54.04 ¹⁰	59.3 ¹⁵	19.20 ⁹	27.9 ¹⁴	17.63 ¹⁴	45.3 ¹⁴	58.53 ⁶	76.6 ²
21.1	53.97 ⁷	57.6 ¹⁷	19.13 ⁷	26.4 ¹⁵	17.53 ¹⁰	43.5 ¹⁸	58.49 ⁴	76.6 ⁰
31.1	53.92 ⁵	55.7 ¹⁹	19.09 ⁴	24.8 ¹⁶	17.47 ⁶	41.4 ²¹	58.47 ²	76.5 ¹
Feb. 10.1	53.90 ²	53.7 ²⁰	19.08 ¹	23.1 ¹⁷	17.46 ¹	38.9 ²⁵	58.48 ¹	76.2 ³
20.0	53.92 ⁶	51.7 ¹⁸	19.10 ⁶	21.4 ¹⁵	17.49 ⁸	36.2 ²⁸	58.52 ⁷	75.7 ⁷
Mar. 2.0	53.98 ¹⁰	49.9 ¹⁶	19.16 ¹⁰	19.9 ¹²	17.57 ¹⁴	33.4 ²⁹	58.59 ¹⁰	75.0 ¹⁰
12.0	54.08 ¹⁴	48.3 ¹⁴	19.26 ¹³	18.7 ¹⁰	17.71 ¹⁹	30.5 ³⁰	58.69 ¹³	74.0 ¹²
21.9	54.22 ¹⁸	46.9 ¹⁰	19.39 ¹⁷	17.7 ⁷	17.90 ²⁴	27.5 ³⁰	58.82 ¹⁷	72.8 ¹⁴
31.9	54.40 ²²	45.9 ⁶	19.56 ²¹	17.0 ³	18.14 ²⁸	24.5 ³⁰	58.99 ²¹	71.4 ¹⁵
Apr. 10.9	54.62 ²⁶	45.3 ²	19.77 ²⁵	16.7 ¹	18.42 ³³	21.5 ²⁹	59.20 ²⁴	69.9 ¹⁷
20.9	54.88 ²⁹	45.1 ³	20.02 ²⁸	16.8 ⁵	18.75 ³⁷	18.6 ²⁷	59.44 ²⁷	68.2 ¹⁹
30.8	55.17 ³¹	45.4 ⁷	20.30 ³⁰	17.3 ⁹	19.12 ⁴¹	15.9 ²⁴	59.71 ²⁹	66.3 ²⁰
May 10.8	55.48 ³⁴	46.1 ¹²	20.60 ³²	18.2 ¹³	19.53 ⁴⁴	13.5 ²²	60.00 ³¹	64.3 ²⁰
20.8	55.82 ³⁵	47.3 ¹⁶	20.92 ³⁴	19.5 ¹⁷	19.97 ⁴⁶	11.3 ¹⁸	60.31 ³³	62.3 ²⁰
30.8	56.17 ³⁵	48.9 ¹⁹	21.26 ³⁴	21.2 ²⁰	20.43 ⁴⁷	9.5 ¹⁵	60.64 ³³	60.3 ²⁰
June 9.7	56.52 ³⁴	50.8 ²³	21.60 ³³	23.2 ²²	20.90 ⁴⁷	8.0 ¹⁰	60.97 ³³	58.3 ¹⁹
19.7	56.86 ³³	53.1 ²⁵	21.93 ³²	25.4 ²⁴	21.37 ⁴⁵	7.0 ⁶	61.30 ³²	56.4 ¹⁷
29.7	57.19 ³⁰	55.6 ²⁷	22.25 ²⁹	27.8 ²⁶	21.82 ⁴²	6.4 ²	61.62 ³⁰	54.7 ¹⁵
July 9.6	57.49 ²⁷	58.3 ²⁸	22.54 ²⁷	30.4 ²⁷	22.24 ³⁸	6.2 ³	61.92 ²⁷	53.2 ¹³
19.6	57.76 ²³	61.1 ²⁹	22.81 ²³	33.1 ²⁶	22.62 ³⁴	6.5 ⁷	62.19 ²⁴	51.9 ¹¹
29.6	57.99 ¹⁹	64.0 ²⁸	23.04 ¹⁹	35.7 ²⁶	22.96 ²⁹	7.2 ¹¹	62.43 ²¹	50.8 ⁸
Aug. 8.6	58.18 ¹⁵	66.8 ²⁸	23.23 ¹⁵	38.3 ²⁵	23.25 ²³	8.3 ¹⁵	62.64 ¹⁷	50.0 ⁶
18.5	58.33 ¹⁰	69.6 ²⁷	23.38 ¹⁰	40.8 ²⁴	23.48 ¹⁶	9.8 ¹⁸	62.81 ¹²	49.4 ³
28.5	58.43 ⁵	72.3 ²⁵	23.48 ⁶	43.2 ²²	23.64 ⁹	11.6 ²⁰	62.93 ⁷	49.1 ⁰
Sept. 7.5	58.48 ¹	74.8 ²³	23.54 ²	45.4 ²⁰	23.73 ²	13.6 ²¹	63.00 ³	49.1 ²
17.5	58.49 ³	77.1 ²⁰	23.56 ²	47.4 ¹⁷	23.75 ⁴	15.7 ²²	63.03 ⁰	49.3 ⁴
27.4	58.46 ⁷	79.1 ¹⁸	23.54 ⁵	49.1 ¹⁴	23.71 ¹⁰	17.9 ²¹	63.03 ⁴	49.7 ⁵
Oct. 7.4	58.39 ⁹	80.9 ¹⁵	23.49 ⁸	50.5 ¹¹	23.61 ¹⁵	20.0 ²⁰	62.99 ⁷	50.2 ⁶
17.4	58.30 ¹²	82.4 ¹¹	23.41 ¹⁰	51.6 ⁹	23.46 ¹⁹	22.0 ¹⁸	62.92 ⁹	50.8 ⁷
27.3	58.18 ¹³	83.5 ⁸	23.31 ¹²	52.5 ⁶	23.27 ²²	23.8 ¹⁴	62.83 ¹¹	51.5 ⁸
Nov. 6.3	58.05 ¹⁴	84.3 ⁴	23.19 ¹³	53.1 ²	23.05 ²⁴	25.2 ¹¹	62.72 ¹²	52.3 ⁷
16.3	57.91 ¹⁵	84.7 ⁰	23.06 ¹⁴	53.3 ¹	22.81 ²⁴	26.3 ⁷	62.60 ¹²	53.0 ⁷
26.3	57.76 ¹⁵	84.7 ⁴	22.92 ¹³	53.2 ⁴	22.57 ²²	27.0 ²	62.48 ¹¹	53.7 ⁶
Dec. 6.2	57.61 ¹⁴	84.3 ⁷	22.79 ¹²	52.8 ⁷	22.33 ²²	27.2 ²	62.37 ¹⁰	54.3 ⁵
16.2	57.47 ¹³	83.6 ¹⁰	22.67 ¹¹	52.1 ¹⁰	22.11 ¹⁹	27.0 ⁷	62.27 ⁹	54.8 ⁴
26.2	57.34 ¹¹	82.6 ¹⁴	22.56 ¹⁰	51.1 ¹³	21.92 ¹⁷	26.3 ¹¹	62.18 ⁸	55.2 ²
36.2	57.23	81.2	22.46	49.8	21.75	25.2	62.10	55.4
Sec δ, Tan δ	1.152	+0.572	1.087	+0.427	1.616	-1.270	1.031	-0.250
Mean Place	55°.329	56''.98	20°.335	27''.18	18°.282	28''.29	59°.240	67''.23
D'ψ a, Dω a	-0.01	-0.04	0.00	-0.03	+0.01	+0.08	0.00	+0.02
Dψ δ, Dω δ	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	μ Pegasi. Mag. 3.7		ι Cephei. Mag. 3.7		λ Aquarii. Mag. 3.8		ρ Indi. Mag. 6.1	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 22 45 s	° ' +24 8 "	h m 22 46 s	° ' +65 44 "	h m 22 48 s	° ' - 8 2 "	h m 22 48 s	° ' -70 31 "
Jan. 1.2	47.13	33.6	31.96	45.8	3.92	41.4	36.57	100.4
11.1	47.04 9	32.2 14	31.58 38	44.1 17	3.85 7	41.8 4	36.21 36	98.3 21
21.1	46.97 7	30.6 16	31.25 33	42.0 21	3.81 4	42.1 3	35.92 29	95.8 25
31.1	46.92 5	28.9 17	30.99 26	39.5 25	3.79 2	42.3 2	35.72 20	92.9 29
Feb. 10.1	46.91 1	27.2 17	30.81 18	36.7 28	3.80 1	42.3 0	35.61 11	89.7 32
	2	16	9	30	3	1	2	34
20.0	46.93	25.6	30.72	33.7	3.83	42.2	35.59	86.3
Mar. 2.0	46.98 5	24.1 15	30.72 0	30.7 30	3.89 6	41.8 4	35.67 8	82.7 36
12.0	47.07 9	22.8 13	30.82 10	27.7 30	3.99 10	41.2 6	35.85 18	79.1 36
22.0	47.20 13	21.7 11	31.01 19	24.9 28	4.12 13	40.4 8	36.13 28	75.5 36
31.9	47.37 17	20.9 8	31.29 28	22.5 24	4.28 16	39.4 10	36.50 37	72.0 35
	21	4	37	20	20	13	46	34
Apr. 10.9	47.58	20.5	31.66	20.5	4.48	38.1	36.96	68.6
20.9	47.82 24	20.6 1	32.11 45	19.0 15	4.71 23	36.6 15	37.50 54	65.5 31
30.8	48.10 28	21.1 5	32.62 51	18.0 10	4.97 26	34.9 17	38.11 61	62.6 29
May 10.8	48.41 31	22.0 9	33.18 56	17.6 4	5.26 29	33.1 18	38.78 67	60.1 25
20.8	48.73 32	23.2 12	33.77 59	17.8 2	5.57 31	31.2 19	39.50 72	58.0 21
	34	16	61	7	32	20	75	16
30.8	49.07	24.8	34.38	18.5	5.89	29.2	40.25	56.4
June 9.7	49.41 34	26.8 20	34.98 60	19.8 13	6.22 33	27.2 20	41.02 77	55.3 11
19.7	49.74 33	29.0 22	35.56 58	21.7 19	6.54 32	25.2 20	41.79 77	54.7 6
29.7	50.06 32	31.4 24	36.11 55	24.0 23	6.85 31	23.3 19	42.53 74	54.6 1
July 9.7	50.36 30	34.0 26	36.61 50	26.7 27	7.15 30	21.6 17	43.23 70	55.0 4
	27	27	44	31	27	16	64	9
19.6	50.63	36.7	37.05	29.8	7.42	20.0	43.87	55.9
29.6	50.87 24	39.4 27	37.41 36	33.2 34	7.66 24	18.6 14	44.44 57	57.3 14
Aug. 8.6	51.07 20	42.0 26	37.70 29	36.8 36	7.86 20	17.4 12	44.91 47	59.1 18
18.5	51.22 15	44.6 26	37.91 21	40.5 37	8.02 16	16.5 9	45.28 37	61.3 22
28.5	51.33 11	47.0 24	38.03 12	44.2 37	8.14 12	15.9 6	45.53 25	63.8 25
	6	22	4	37	8	4	13	26
Sept. 7.5	51.39	49.2	38.07	47.9	8.22	15.5	45.66	66.4
17.5	51.41 2	51.2 20	38.02 5	51.5 36	8.26 4	15.3 2	45.66 0	69.1 27
27.4	51.39 2	53.0 18	37.89 13	55.0 35	8.26 0	15.3 0	45.54 12	71.8 27
Oct. 7.4	51.34 5	54.5 15	37.69 20	58.2 32	8.22 4	15.5 2	45.31 23	74.4 26
17.4	51.27 7	55.7 12	37.42 27	61.1 29	8.16 6	15.9 4	44.98 33	76.8 24
	10	9	32	25	9	5	41	20
27.4	51.17	56.6	37.10	63.6	8.07	16.4	44.57	78.8
Nov. 6.3	51.05 12	57.2 6	36.73 37	65.6 20	7.97 10	17.0 6	44.09 48	80.4 16
16.3	50.92 13	57.5 3	36.33 40	67.1 15	7.86 11	17.6 6	43.57 52	81.5 11
26.3	50.79 13	57.5 0	35.90 43	68.1 10	7.75 11	18.2 6	43.03 54	82.0 5
Dec. 6.2	50.66 13	57.1 4	35.46 44	68.5 4	7.64 11	18.8 6	42.49 54	81.9 1
	13	7	44	2	10	6	51	6
16.2	50.53	56.4	35.02	68.3	7.54	19.4	41.98	81.3
26.2	50.41 12	55.4 10	34.59 43	67.6 7	7.45 9	19.9 5	41.51 47	80.1 12
36.2	50.31 10	54.2 12	34.19 40	66.3 13	7.37 8	20.3 4	41.10 41	78.4 17
Sec δ, Tan δ	1.096	+0.448	2.434	+2.219	1.010	-0.141	3.001	-2.830
Mean Place	48°.176	30''.97	34°.797	33''.37	4°.589	34''.12	37°.089	79''.58
D'φ a, D∞ a	0.00	-0.03	-0.02	-0.14	0.00	+0.01	+0.02	+0.18
Dφ δ, D∞ δ	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	δ Aquarii. Mag. 3.5		α Piscis Australis. Mag. 1.3		γ Andromedæ. Mag. 3.6		β Pegasi. Var. 2.2-2.7	
	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 22 50 s	° ' -16 16 "	h m 22 52 s	° ' -30 4 "	h m 22 57 s	° ' +41 51 "	h m 22 59 s	° ' +27 36 "
Jan. 1.2	1.46	71.2	50.26	74.6	53.53	37.7	32.26	42.6
11.1	1.40 6	71.3 1	50.18 8	74.2 4	53.38 15	36.2 15	32.15 11	41.3 13
21.1	1.35 5	71.2 1	50.12 6	73.5 7	53.25 13	34.3 19	32.06 9	39.7 16
31.1	1.33 2	71.0 2	50.09 3	72.5 10	53.15 10	32.1 22	32.00 6	38.0 17
Feb. 10.1	1.33 0	70.6 4	50.09 0	71.2 13	53.09 6	29.8 23	31.97 3	36.2 18
	3	7	3	15	2	23	0	18
20.0	1.36	69.9	50.12	69.7	53.07	27.5	31.97	34.4
Mar. 2.0	1.42 6	69.0 9	50.18 6	68.0 17	53.09 2	25.2 23	32.00 3	32.7 17
12.0	1.52 10	67.9 11	50.28 10	66.1 19	53.16 7	23.0 22	32.08 8	31.2 15
22.0	1.65 13	66.6 13	50.42 14	64.1 20	53.29 13	21.0 20	32.20 12	30.0 12
31.9	1.82 17	65.1 15	50.60 18	61.9 22	53.47 18	19.4 16	32.36 16	29.1 9
	20	16	21	23	23	12	20	6
Apr. 10.9	2.02	63.5	50.81	59.6	53.70	18.2	32.56	28.5
20.9	2.25 23	61.7 18	51.06 25	57.3 23	53.97 27	17.4 8	32.80 24	28.3 2
30.8	2.52 27	59.7 20	51.34 28	54.9 24	54.28 31	17.1 3	33.07 27	28.6 3
May 10.8	2.81 29	57.7 20	51.66 32	52.6 23	54.63 35	17.3 2	33.38 31	29.3 7
20.8	3.13 32	55.6 21	52.00 34	50.4 22	55.00 37	18.0 7	33.71 33	30.4 11
	33	20	35	21	38	12	34	15
30.8	3.46	53.6	52.35	48.3	55.38	19.2	34.05	31.9
June 9.7	3.79 33	51.6 20	52.71 36	46.4 19	55.77 39	20.9 17	34.40 35	33.7 18
19.7	4.12 33	49.7 19	53.07 36	44.8 16	56.15 38	22.9 20	34.74 34	35.8 21
29.7	4.44 32	48.0 17	53.42 35	43.5 13	56.52 37	25.3 24	35.07 33	38.2 24
July 9.7	4.75 31	46.5 15	53.76 34	42.5 10	56.86 34	28.0 27	35.38 31	40.8 26
	28	13	31	7	31	29	29	27
19.6	5.03	45.2	54.07	41.8	57.17	30.9	35.67	43.5
29.6	5.28 25	44.2 10	54.34 27	41.4 4	57.44 27	34.0 31	35.92 25	46.3 28
Aug. 8.6	5.49 21	43.5 7	54.57 23	41.4 0	57.66 22	37.2 32	36.13 21	49.0 27
18.5	5.66 17	43.1 4	54.76 19	41.7 3	57.84 18	40.4 32	36.30 17	51.7 27
28.5	5.79 13	42.9 2	54.90 14	42.4 7	57.97 13	43.6 32	36.42 12	54.3 26
	8	1	9	9	7	31	8	24
Sept. 7.5	5.87	43.0	54.99	43.3	58.04	46.7	36.50	56.7
17.5	5.91 4	43.3 3	55.03 4	44.4 11	58.06 2	49.6 29	36.54 4	59.0 23
27.4	5.91 0	43.8 5	55.03 0	45.6 12	58.04 2	52.2 26	36.53 1	61.0 20
Oct. 7.4	5.87 4	44.5 7	54.99 4	46.9 13	57.98 6	54.6 24	36.49 4	62.7 17
17.4	5.80 7	45.3 8	54.91 8	48.3 14	57.88 10	56.7 21	36.42 7	64.1 14
	9	8	11	13	13	18	9	12
27.4	5.71	46.1	54.80	49.6	57.75	58.5	36.33	65.3
Nov. 6.3	5.60 11	46.9 8	54.67 13	50.8 12	57.60 15	59.9 14	36.22 11	66.1 8
16.3	5.49 11	47.7 8	54.53 14	51.8 10	57.43 17	60.8 9	36.09 13	66.6 5
26.3	5.37 12	48.4 7	54.39 14	52.6 8	57.25 18	61.3 5	35.96 13	66.7 1
Dec. 6.2	5.25 12	49.0 6	54.25 14	53.2 6	57.06 19	61.3 0	35.82 14	66.5 2
	11	5	13	3	18	4	13	6
16.2	5.14	49.5	54.12	53.5	56.88	60.9	35.69	65.9
26.2	5.05 9	49.8 3	54.01 11	53.6 1	56.70 18	60.0 9	35.56 13	65.0 9
36.2	4.98 7	50.0 2	53.92 9	53.3 3	56.53 17	58.7 13	35.45 11	63.8 12
Sec δ , Tan δ	1.042	-0.292	1.156	-0.579	1.343	+0.896	1.129	+0.523
Mean Place	2°.062	61''.49	50°.766	61''.07	54°.897	29''.47	33°.287	38''.27
D' ψ α , D ω α	0.00	+0.02	0.00	+0.04	-0.01	-0.06	0.00	-0.03
D ψ δ , D ω δ	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3	+0.4	-0.3

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Pegasi. Mag. 2.6		$\delta\delta$ Pegasi. Mag. 4.7		c^2 Aquarii. Mag. 3.8		π Cephei. Mag. 4.6	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.
	h m 23 0 s	° ' " +14 44 "	h m 23 2 s	° ' " + 8 56 "	h m 23 4 s	° ' " -21 38 "	h m 23 5 s	° ' " +74 54 "
Jan. 1.2	24.73	13.5	36.51	20.0	48.09	52.7	3.42	76.3
11.2	24.64 9	12.4 11	36.43 8	19.1 9	48.01 8	52.6 1	2.73 69	75.0 13
21.1	24.57 7	11.2 12	36.37 6	18.1 10	47.95 6	52.3 3	2.11 62	73.1 19
31.1	24.53 4	9.9 13	36.33 4	17.1 10	47.91 4	51.8 5	1.59 52	70.8 23
Feb. 10.1	24.51 2	8.7 12	36.31 2	16.2 9	47.90 1	51.0 8	1.19 40	68.1 27
	1	11	1	8	2	10	26	29
20.0	24.52	7.6	36.32	15.4	47.92	50.0	0.93	65.2
Mar. 2.0	24.56 4	6.6 10	36.36 4	14.7 7	47.97 5	48.8 12	0.82 11	62.1 31
	8	8	8	5	8	14	4	31
12.0	24.64 12	5.8 5	36.44 11	14.2 2	48.05 12	47.4 16	0.86 20	59.0 30
22.0	24.76 15	5.3 3	36.55 15	14.0 1	48.17 15	45.8 18	1.06 35	56.0 27
31.9	24.91 19	5.0 1	36.70 19	14.1 4	48.32 19	44.0 19	1.41 49	53.3 24
Apr. 10.9	25.10 22	5.1 4	36.89 22	14.5 7	48.51 23	42.1 21	1.90 62	50.9 19
20.9	25.32 26	5.5 8	37.11 25	15.2 10	48.74 26	40.0 22	2.52 73	49.0 14
30.9	25.58 29	6.3 11	37.36 28	16.2 13	49.00 29	37.8 22	3.25 81	47.6 9
May 10.8	25.87 31	7.4 15	37.64 30	17.5 16	49.29 31	35.6 22	4.06 86	46.7 3
20.8	26.18 32	8.9 17	37.94 32	19.1 18	49.60 33	33.4 22	4.92 89	46.4 3
30.8	26.50 33	10.6 20	38.26 32	20.9 20	49.93 34	31.2 21	5.81 90	46.7 9
June 9.7	26.83 32	12.6 21	38.58 33	22.9 22	50.27 35	29.1 18	6.71 88	47.6 15
19.7	27.15 32	14.7 23	38.91 32	25.1 22	50.62 34	27.3 16	7.59 83	49.1 20
29.7	27.47 30	17.0 24	39.23 30	27.3 22	50.96 32	25.7 14	8.42 76	51.1 24
July 9.7	27.77 27	19.4 24	39.53 27	29.5 22	51.28 29	24.3 11	9.18 68	53.5 29
19.6	28.04 24	21.8 23	39.80 24	31.7 22	51.57 27	23.2 8	9.86 58	56.4 32
29.6	28.28 21	24.1 22	40.04 21	33.9 20	51.84 23	22.4 5	10.44 47	59.6 35
Aug. 8.6	28.49 17	26.3 21	40.25 17	35.9 18	52.07 19	21.9 2	10.91 34	63.1 37
18.6	28.66 13	28.4 20	40.42 13	37.7 16	52.26 14	21.7 1	11.25 22	66.8 38
28.5	28.79 8	30.4 18	40.55 8	39.3 14	52.40 10	21.8 4	11.47 9	70.6 38
Sept. 7.5	28.87 4	32.2 15	40.63 5	40.7 12	52.50 5	22.2 6	11.56 4	74.4 38
17.5	28.91 1	33.7 13	40.68 1	41.9 10	52.55 1	22.8 8	11.52 16	78.2 37
27.4	28.92 3	35.0 10	40.69 2	42.9 7	52.56 3	23.6 10	11.36 28	81.9 35
Oct. 7.4	28.89 6	36.0 8	40.67 5	43.6 5	52.53 6	24.6 10	11.08 39	85.4 33
17.4	28.83 8	36.8 5	40.62 8	44.1 3	52.47 8	25.6 11	10.69 49	88.7 29
27.4	28.75 10	37.3 3	40.54 10	44.4 1	52.39 10	26.7 10	10.20 58	91.6 25
Nov. 6.3	28.65 11	37.6 1	40.44 10	44.5 2	52.29 12	27.7 9	9.62 65	94.1 20
16.3	28.54 11	37.7 2	40.34 11	44.3 3	52.17 12	28.6 8	8.97 71	96.1 15
26.3	28.43 12	37.5 4	40.23 11	44.0 5	52.05 12	29.4 7	8.26 74	97.6 9
Dec. 6.3	28.31 11	37.1 7	40.12 10	43.5 6	51.93 11	30.1 5	7.52 76	98.5 3
16.2	28.20 10	36.4 8	40.02 10	42.9 8	51.82 11	30.6 3	6.76 75	98.8 3
26.2	28.10 9	35.6 10	39.92 8	42.1 9	51.71 9	30.9 1	6.01 72	98.5 10
36.2	28.01	34.6 10	39.84	41.2	51.62	31.0	5.29	97.5
Sec δ , Tan δ	1.034	+0.263	1.012	+0.157	1.076	-0.397	3.843	+3.711
Mean Place	25 ^s .557	13'''.07	37 ^s .259	21'''.32	48 ^s .568	41'''.69	7 ^s .637	61'''.30
D' ψ α , D ω α	0.00	-0.02	0.00	-0.01	+0.01	+0.03	-0.02	-0.24
D ψ δ , D ω δ	+0.4	-0.3	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	1 Gruis. Mag. 4.1		59 Pegasi. Mag. 5.2		5 Cassiop. (Heis). Mag. 5.6		φ Aquarii. Mag. 4.4	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 23 5 s	° ' -45 42 "	h m 23 7 s	° ' + 8 14 "	h m 23 9 s	° ' +56 41 "	h m 23 9 s	° ' - 6 30 "
Jan. 1.2	25.97	82.6	19.89	49.7	3.50	29.0	48.46	71.7
11.2	25.83 14	81.6 10	19.81 8	48.8 9	3.25 25	27.6 14	48.38 8	72.2 5
21.1	25.72 11	80.2 14	19.74 7	47.9 9	3.02 23	25.7 19	48.32 6	72.6 4
31.1	25.65 7	78.5 17	19.70 4	47.0 9	2.83 19	23.4 23	48.28 4	72.8 2
Feb. 10.1	25.62 3	76.5 20	19.68 2	46.1 9	2.70 13	20.8 26	48.27 1	72.9 1
	0	23	1	8	8	27	1	1
20.0	25.62	74.2	19.69	45.3	2.62	18.1	48.28	72.8
Mar. 2.0	25.67 5	71.6 26	19.73 4	44.7 6	2.61 1	15.3 28	48.32 4	72.5 3
12.0	25.76 9	68.8 28	19.80 7	44.3 4	2.67 6	12.6 27	48.39 7	72.0 5
22.0	25.90 14	66.0 28	19.91 11	44.1 2	2.80 13	10.1 25	48.50 11	71.3 7
31.9	26.08 18	63.1 29	20.05 14	44.2 1	3.01 21	7.9 22	48.64 14	70.3 10
	23	29	18	4	27	19	18	12
Apr. 10.9	26.31	60.2	20.23	44.6	3.28	6.0	48.82	69.1
20.9	26.59 28	57.3 29	20.45 22	45.3 7	3.62 34	4.6 14	49.03 21	67.7 14
30.9	26.91 32	54.5 28	20.70 25	46.4 11	4.01 39	3.6 10	49.28 25	66.1 16
May 10.8	27.26 35	51.9 26	20.98 28	47.7 13	4.44 43	3.2 4	49.56 28	64.3 18
20.8	27.64 38	49.5 24	21.28 30	49.3 16	4.91 47	3.4 2	49.86 30	62.3 20
	41	21	32	19	49	7	31	20
30.8	28.05	47.4	21.60	51.2	5.40	4.1	50.17	60.3
June 9.7	28.47 42	45.6 18	21.92 32	53.2 20	5.90 50	5.4 13	50.49 32	58.2 21
19.7	28.89 42	44.2 14	22.24 32	55.3 21	6.39 49	7.2 18	50.82 33	56.2 20
29.7	29.30 41	43.2 10	22.56 32	57.5 22	6.85 46	9.4 22	51.14 32	54.2 20
July 9.7	29.70 40	42.6 6	22.86 30	59.7 22	7.28 43	12.0 26	51.44 30	52.3 19
	37	2	27	22	40	30	28	17
19.6	30.07	42.4	23.13	61.9	7.68	15.0	51.72	50.6
29.6	30.40 33	42.6 2	23.38 25	64.0 21	8.03 35	18.2 32	51.98 26	49.1 15
Aug. 8.6	30.69 29	43.3 7	23.59 21	66.0 20	8.32 29	21.6 34	52.20 22	47.9 12
18.6	30.92 23	44.4 11	23.77 18	67.8 18	8.55 23	25.1 35	52.38 18	46.9 10
28.5	31.09 17	45.8 14	23.90 13	69.4 16	8.71 16	28.7 36	52.52 14	46.1 8
	12	17	9	14	10	35	10	5
Sept. 7.5	31.21	47.5	23.99	70.8	8.81	32.2	52.62	45.6
17.5	31.27 6	49.4 19	24.04 5	71.9 11	8.85 4	35.6 34	52.68 6	45.3 3
27.4	31.27 0	51.4 20	24.06 2	72.8 9	8.82 3	38.9 33	52.69 1	45.2 1
Oct. 7.4	31.21 6	53.4 20	24.04 2	73.5 7	8.74 8	42.0 31	52.67 2	45.4 2
17.4	31.11 10	55.4 20	23.99 5	74.0 5	8.60 14	44.8 28	52.63 4	45.8 4
	14	18	7	2	18	24	7	4
27.4	30.97	57.2	23.92	74.2	8.42	47.2	52.56	46.2
Nov. 6.3	30.80 17	58.8 16	23.83 9	74.2 0	8.21 21	49.2 20	52.47 9	46.7 5
16.3	30.61 19	60.1 13	23.73 10	74.1 1	7.97 24	50.7 15	52.37 10	47.3 6
26.3	30.41 20	61.0 9	23.63 10	73.8 3	7.70 27	51.7 10	52.26 11	47.9 6
Dec. 6.3	30.21 20	61.6 6	23.52 11	73.3 5	7.42 28	52.2 5	52.16 10	48.6 7
	19	1	11	6	29	0	10	6
16.2	30.02	61.7	23.41	72.7	7.13	52.2	52.06	49.2
26.2	29.85 17	61.4 3	23.31 10	71.9 8	6.85 28	51.6 6	51.97 9	49.8 6
36.2	29.69 16	60.6 8	23.23 8	71.1 8	6.58 27	50.5 11	51.88 9	50.3 6
Sec δ, Tan δ	1.432	-1.025	1.010	+0.145	+1.821	+1.522	1.007	-0.114
Mean Place	26°.294	65''.50	20°.609	51''.07	5°.382	16''.57	49°.021	65''.56
D'ψ α, Dω α	+0.01	+0.07	0.00	-0.01	-0.01	-0.10	0.00	+0.01
Dψ δ, Dω δ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♊ Aquarii. Mag. 4.5		♑ Tucanæ. Mag. 4.1		♓ Piscium. Mag. 3.8		♐ Sculptoris. Mag. 4.5	
	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion S.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion S.
	h m 23 11 s	° ' - 9 33 "	h m 23 12 s	° ' -58 42 "	h m 23 12 s	° ' + 2 48 "	h m 23 14 s	° ' -33 0 "
Jan. 1.2	19.56	49.4	21.29	66.9	38.66	21.4	7.36	36.2
11.2	19.48 8	49.8 4	21.06 23	65.5 14	38.58 8	20.6 8	7.26 10	35.8 4
21.1	19.42 6	50.1 3	20.88 18	63.6 19	38.52 6	19.9 7	7.18 8	35.0 8
31.1	19.38 4	50.2 1	20.74 14	61.3 23	38.48 4	19.3 6	7.12 6	33.9 11
Feb. 10.1	19.37 1	50.1 1	20.65 9	58.7 26	38.46 2	18.7 6	7.09 3	32.5 14
	19.38 1	49.8 3	20.62 3	55.8 29	38.47 1	18.2 5	7.09 0	30.9 16
20.1	19.38	49.8	20.62	55.8	38.47	18.2	7.09	30.9
Mar. 2.0	19.42 4	49.3 5	20.64 2	52.7 31	38.50 3	17.9 3	7.13 4	29.0 19
12.0	19.49 7	48.6 7	20.73 9	49.4 33	38.57 7	17.8 1	7.21 8	26.9 21
22.0	19.59 10	47.7 9	20.88 15	46.0 34	38.67 10	18.0 2	7.32 11	24.7 22
31.9	19.73 14	46.6 11	21.09 21	42.6 34	38.81 14	18.5 5	7.47 15	22.3 24
	19.73 18	46.6 14	21.09 27	42.6 33	38.81 18	18.5 7	7.47 19	22.3 25
Apr. 10.9	19.91	45.2	21.36	39.3	38.99	19.2	7.66	19.8
20.9	20.13 22	43.6 16	21.69 33	36.1 32	39.20 21	20.2 10	7.90 24	17.3 25
30.9	20.38 25	41.9 17	22.08 39	33.1 30	39.45 25	21.4 12	8.17 27	14.7 26
May 10.8	20.65 27	40.0 19	22.52 44	30.3 28	39.73 28	22.9 15	8.47 30	12.2 25
20.8	20.95 30	38.0 20	22.99 47	27.8 25	40.03 30	24.6 17	8.80 33	9.8 24
	20.95 32	38.0 21	22.99 50	27.8 21	40.03 31	24.6 19	8.80 35	9.8 22
30.8	21.27	35.9	23.49	25.7	40.34	26.5	9.15	7.6
June 9.8	21.60 33	33.8 21	24.01 52	24.0 17	40.66 32	28.6 21	9.52 37	5.6 20
19.7	21.93 33	31.8 20	24.54 53	22.8 12	40.99 33	30.7 21	9.89 37	3.9 17
29.7	22.25 32	29.8 20	25.06 52	22.1 7	41.31 32	32.9 22	10.25 36	2.4 15
July 9.7	22.56 31	28.0 18	25.56 50	21.9 2	41.61 30	35.0 21	10.60 35	1.3 11
	22.56 29	28.0 16	25.56 47	21.9 2	41.61 28	35.0 20	10.60 33	1.3 7
19.6	22.85	26.4	26.03	22.1	41.89	37.0	10.93	0.6
29.6	23.11 26	25.0 14	26.45 42	22.8 7	42.14 25	38.9 19	11.23 30	0.3 3
Aug. 8.6	23.33 22	23.9 11	26.81 36	24.0 12	42.36 22	40.6 17	11.48 25	0.3 0
18.6	23.51 18	23.1 8	27.11 30	25.6 16	42.54 18	42.1 15	11.69 21	0.7 4
28.5	23.65 14	22.5 6	27.33 22	27.6 20	42.68 14	43.4 13	11.85 16	1.4 7
	23.65 10	22.5 3	27.33 14	27.6 22	42.68 10	43.4 11	11.85 11	1.4 10
Sept. 7.5	23.75	22.2	27.47	29.8	42.78	44.5	11.96	2.4
17.5	23.81 6	22.1 1	27.54 7	32.2 24	42.84 6	45.3 8	12.03 7	3.7 13
27.5	23.83 2	22.2 1	27.53 1	34.7 25	42.86 2	45.9 6	12.05 2	5.1 14
Oct. 7.4	23.82 1	22.5 3	27.44 9	37.2 25	42.85 1	46.3 4	12.03 2	6.6 15
17.4	23.78 4	23.0 5	27.29 15	39.5 23	42.81 4	46.5 2	11.96 7	8.2 16
	23.78 7	23.0 6	27.29 21	39.5 21	42.81 6	46.5 0	11.96 10	8.2 15
27.4	23.71	23.6	27.08	41.6	42.75	46.5	11.86	9.7
Nov. 6.3	23.62 9	24.2 6	26.83 25	43.4 18	42.66 9	46.3 2	11.74 12	11.1 14
16.3	23.52 10	24.9 7	26.55 28	44.8 14	42.56 10	46.0 3	11.61 13	12.3 12
26.3	23.41 11	25.6 7	26.25 30	45.8 10	42.46 10	45.5 5	11.47 14	13.3 10
Dec. 6.3	23.30 11	26.3 7	25.94 31	46.3 5	42.36 10	45.0 5	11.32 15	14.0 7
	23.30 10	26.3 6	25.94 30	46.3 1	42.36 10	45.0 6	11.32 14	14.0 4
16.2	23.20	26.9	25.64	46.2	42.26	44.4	11.18	14.4
26.2	23.11 9	27.4 5	25.36 28	45.6 6	42.17 9	43.7 7	11.05 13	14.5 1
36.2	23.02 9	27.8 4	25.11 25	44.5 11	42.08 9	43.0 7	10.93 12	14.3 2
Sec δ, Tan δ	1.014	-0.168	1.926	-1.645	1.001	+0.049	1.192	-0.650
Mean Place	20°.087	42''.35	21°.473	47''.47	39°.294	24''.38	7°.705	22''.21
D'ψ α, Dω α	0.00	+0.01	+0.01	+0.11	0.00	0.00	0.00	+0.04
Dψ δ, Dω δ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	o Cephei. Mag. 4.9		τ Pegasi. Mag. 4.6		δ ¹ Aquarii. Mag. 4.2		4 Cassiopeiæ. Mag. 5.2	
	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination N.
	h m 23 14 s	° ' +67 37 "	h m 23 16 s	° ' +23 15 "	h m 23 18 s	° ' -20 34 "	h m 23 20 s	° ' +61 48 "
Jan. 1.2	60.13	82.0	18.86	54.0	23.75	42.9	55.88	32.3
11.2	59.69 44	80.7 13	18.75 11	52.9 11	23.66 9	42.9 0	55.55 33	31.1 12
21.1	59.29 40	78.9 18	18.66 9	51.5 14	23.59 7	42.7 2	55.25 30	29.3 18
31.1	58.96 33	76.7 22	18.59 7	50.0 15	23.54 5	42.3 4	55.00 25	27.1 22
Feb. 10.1	58.70 26 17	74.1 26 28	18.55 4 1	48.5 15 15	23.52 2 0	41.6 7 9	54.80 20 13	24.6 25 27
20.1	58.53 8	71.3 30	18.54 2	47.0 15	23.52 3	40.7 11	54.67 6	21.9 29
Mar. 2.0	58.45 3	68.3 30	18.56 6	45.5 13	23.55 6	39.6 14	54.61 2	19.0 29
12.0	58.48 14	65.3 28	18.62 10	44.2 10	23.61 10	38.2 16	54.63 11	16.1 27
22.0	58.62 24	62.5 26	18.72 14	43.2 7	23.71 14	36.6 18	54.74 20	13.4 24
31.9	58.86 34	59.9 23	18.86 18	42.5 4	23.85 18	34.8 19	54.94 28	11.0 21
Apr. 10.9	59.20 43	57.6 18	19.04 22	42.1 0	24.03 21	32.9 21	55.22 35	8.9 17
20.9	59.63 51	55.8 13	19.26 26	42.1 4	24.24 25	30.8 22	55.57 42	7.2 12
30.9	60.14 57	54.5 8	19.52 29	42.5 7	24.49 28	28.6 22	55.99 47	6.0 7
May 10.8	60.71 62	53.7 2	19.81 31	43.2 11	24.77 30	26.4 23	56.46 52	5.3 1
20.8	61.33 65	53.5 4	20.12 33	44.3 15	25.07 33	24.1 22	56.98 54	5.2 4
30.8	61.98 65	53.9 9	20.45 34	45.8 18	25.40 34	21.9 21	57.52 55	5.6 10
June 9.8	62.63 64	54.8 15	20.79 34	47.6 21	25.74 34	19.8 19	58.07 54	6.6 15
19.7	63.27 62	56.3 20	21.13 33	49.7 23	26.08 34	17.9 17	58.61 53	8.1 20
29.7	63.89 58	58.3 24	21.46 32	52.0 24	26.42 32	16.2 15	59.14 50	10.1 25
July 9.7	64.47 52	60.7 28	21.78 29	54.4 25	26.74 30	14.7 12	59.64 45	12.6 29
19.6	64.99 45	63.5 32	22.07 26	56.9 26	27.04 27	13.5 9	60.09 39	15.5 31
29.6	65.44 37	66.7 34	22.33 22	59.5 26	27.31 24	12.6 6	60.48 33	18.6 34
Aug. 8.6	65.81 29	70.1 36	22.55 18	62.1 25	27.55 20	12.0 3	60.81 27	22.0 35
18.6	66.10 20	73.7 37	22.73 14	64.6 24	27.75 15	11.7 0	61.08 20	25.5 36
28.5	66.30 12	77.4 38	22.87 10	67.0 22	27.90 11	11.7 3	61.28 12	29.1 36
Sept. 7.5	66.42 3	81.2 37	22.97 6	69.2 20	28.01 7	12.0 5	61.40 5	32.7 36
17.5	66.45 6	84.9 36	23.03 2	71.2 18	28.08 3	12.5 8	61.45 2	36.3 35
27.5	66.39 14	88.5 34	23.05 2	73.0 15	28.11 1	13.3 9	61.43 9	39.8 33
Oct. 7.4	66.25 22	91.9 32	23.03 5	74.5 13	28.10 5	14.2 10	61.34 15	43.1 30
17.4	66.03 29	95.1 28	22.98 7	75.8 10	28.05 7	15.2 11	61.19 21	46.1 27
27.4	65.74 34	97.9 24	22.91 9	76.8 7	27.98 10	16.3 11	60.98 25	48.8 23
Nov. 6.3	65.40 40	100.3 20	22.82 11	77.5 4	27.88 11	17.4 10	60.73 29	51.1 18
16.3	65.00 44	102.3 14	22.71 12	77.9 1	27.77 11	18.4 9	60.44 32	52.9 13
26.3	64.56 46	103.7 8	22.59 12	78.0 2	27.66 12	19.3 7	60.12 34	54.2 8
Dec. 6.3	64.10 47	104.5 2	22.47 12	77.8 5	27.54 11	20.0 6	59.78 36	55.0 2
16.2	63.63 47	104.7 3	22.35 12	77.3 8	27.43 11	20.6 4	59.42 36	55.2 4
26.2	63.16 46	104.4 9	22.23 11	76.5 10	27.32 10	21.0 1	59.06 34	54.8 9
36.2	62.70 46	103.5 9	22.12 11	75.5 10	27.22 10	21.1 1	58.72 34	53.9 9
Sec δ, Tan δ	2.628	+2.431	1.089	+0.430	1.068	-0.375	2.116	+1.865
Mean Place	62°.863	67''.35	19°.722	50''.17	24°.149	32''.58	57°.991	18''.21
D'ψ a, Dω a	-0.01	-0.16	0.00	-0.03	0.00	+0.02	-0.01	-0.12
Dψ δ, Dω δ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

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FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	υ Pegasi. Mag. 4.6		κ Piscium. Mag. 4.9		θ Piscium. Mag. 4.4		70 Pegasi. Mag. 4.7	
	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.	Right Ascension.	Declina- tion N.
	h m 23 21 s	° ' " +22 55 "	h m 23 22 s	° ' " + 0 46 "	h m 23 23 s	° ' " + 5 53 "	h m 23 24 s	° ' " +12 16 "
Jan. 1.2	1.27	33.7	27.80	42.0	32.64	62.2	44.54	50.4
11.2	1.17 10	32.6 11	27.72 8	41.3 7	32.55 9	61.4 8	44.45 9	49.4 10
21.1	1.08 9	31.3 13	27.65 7	40.7 6	32.48 7	60.6 8	44.37 8	48.4 10
31.1	1.01 7	29.9 14	27.60 5	40.1 6	32.43 5	59.8 8	44.31 6	47.4 10
Feb. 10.1	0.96 5	28.4 15	27.57 3	39.6 5	32.40 3	59.1 7	44.28 3	46.4 10
	2	15	0	3	0	6	1	10
20.1	0.94	26.9	27.57	39.3	32.40	58.5	44.27	45.4
Mar. 2.0	0.96 2	25.5 14	27.59 2	39.2 1	32.42 2	58.0 5	44.29 2	44.6 8
12.0	1.02 6	24.2 13	27.65 6	39.3 1	32.47 5	57.7 3	44.34 5	44.0 6
22.0	1.11 9	23.2 10	27.74 9	39.6 3	32.56 9	57.7 0	44.43 9	43.6 4
31.9	1.24 13	22.5 7	27.87 13	40.1 5	32.69 13	58.0 3	44.55 12	43.4 2
	18	4	17	8	17	6	17	2
Apr. 10.9	1.42	22.1	28.04	40.9	32.86	58.6	44.72	43.6
20.9	1.64 22	22.1 0	28.24 20	42.0 11	33.06 20	59.4 8	44.93 21	44.1 5
30.9	1.89 25	22.5 4	28.48 24	43.3 13	33.30 24	60.5 11	45.17 24	44.9 8
May 10.8	2.18 29	23.2 7	28.75 27	44.9 16	33.57 27	61.9 14	45.44 27	46.1 12
20.8	2.49 31	24.3 11	29.04 29	46.7 18	33.86 29	63.5 16	45.74 30	47.6 15
	33	14	31	19	31	18	31	17
30.8	2.82	25.7	29.35	48.6	34.17	65.3	46.05	49.3
June 9.8	3.16 34	27.5 18	29.67 32	50.6 20	34.49 32	67.3 20	46.37 32	51.2 19
19.7	3.50 34	29.6 21	29.99 32	52.7 21	34.81 32	69.4 21	46.70 33	53.3 21
29.7	3.83 33	31.9 23	30.31 32	54.8 21	35.13 32	71.6 22	47.02 32	55.5 22
July 9.7	4.15 32	34.3 24	30.62 31	56.9 21	35.44 31	73.8 22	47.33 31	57.8 23
	29	25	29	20	29	21	29	23
19.6	4.44 26	36.8 26	30.91 26	58.9 18	35.73 26	75.9 20	47.62 26	60.1 22
29.6	4.70 23	39.4 25	31.17 22	60.7 16	35.99 22	77.9 18	47.88 23	62.3 21
Aug. 8.6	4.93 19	41.9 25	31.39 19	62.3 14	36.21 18	79.7 17	48.11 19	64.4 20
18.6	5.12 15	44.4 24	31.58 15	63.7 12	36.39 15	81.4 15	48.30 15	66.4 18
28.5	5.27 10	46.8 22	31.73 11	64.9 10	36.54 11	82.9 13	48.45 11	68.2 16
Sept. 7.5	5.37 6	49.0 20	31.84 6	65.9 7	36.65 7	84.2 10	48.56 7	69.8 14
17.5	5.43 3	51.0 18	31.90 3	66.6 5	36.72 3	85.2 8	48.63 3	71.2 12
27.5	5.46 1	52.8 15	31.93 0	67.1 3	36.75 0	86.0 6	48.66 1	72.4 10
Oct. 7.4	5.45 4	54.3 13	31.93 3	67.4 1	36.75 3	86.6 3	48.65 3	73.4 7
17.4	5.41 7	55.6 10	31.90 6	67.5 1	36.72 6	86.9 1	48.62 6	74.1 5
27.4	5.34 9	56.6 7	31.84 8	67.4 3	36.66 8	87.0 0	48.56 8	74.6 2
Nov. 6.3	5.25 11	57.3 4	31.76 9	67.1 4	36.58 9	87.0 2	48.48 9	74.8 0
16.3	5.14 11	57.7 1	31.67 10	66.7 5	36.49 10	86.8 4	48.39 10	74.8 2
26.3	5.03 12	57.8 2	31.57 10	66.2 6	36.39 10	86.4 5	48.29 11	74.6 4
Dec. 6.3	4.91 12	57.6 5	31.47 10	65.6 6	36.29 10	85.9 6	48.18 11	74.2 5
16.2	4.79 12	57.1 7	31.37 10	65.0 6	36.19 10	85.3 7	48.07 10	73.7 7
26.2	4.67 11	56.4 10	31.27 9	64.4 7	36.09 9	84.6 7	47.97 9	73.0 9
36.2	4.56	55.4	31.18	63.7	36.00	83.9	47.88	72.1
Sec δ, Tan δ	1.086	+0.423	1.000	+0.014	1.005	+0.103	1.023	+0.218
Mean Place	2 ^h .105	29'' .78	28 ^h .358	45'' .32	33 ^h .250	63'' .73	45 ^h .210	49'' .72
D'ψ α, Dω α	0.00	-0.03	0.00	0.00	0.00	-0.01	0.00	-0.01
Dψ δ, Dω δ	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2	+0.4	-0.2

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	β Sculptoris. Mag. 4.5		72 Pegasi (<i>mean</i>). Mag. 5.2		λ Andromedæ. Mag. 4.0		ι Andromedæ. Mag. 4.3	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 23 28 s	° ' " -38 17 "	h m 23 29 s	° ' " +30 50 "	h m 23 33 s	° ' " +45 59 "	h m 23 33 s	° ' " +42 47 "
Jan. 1.2	18.36	73.9	37.13	49.3	16.87	23.6	50.78	21.4
11.2	18.24 ¹²	73.4 ⁵	37.00 ¹³	48.1 ¹²	16.68 ¹⁹	22.4 ¹²	50.61 ¹⁷	20.2 ¹⁸
21.1	18.13 ¹¹	72.5 ⁹	36.89 ¹¹	46.7 ¹⁴	16.51 ¹⁷	20.8 ¹⁶	50.45 ¹⁶	18.7 ¹⁵
31.1	18.05 ⁸	71.2 ¹³	36.80 ⁹	45.1 ¹⁶	16.36 ¹⁵	18.9 ¹⁹	50.32 ¹³	16.9 ¹⁸
Feb. 10.1	18.00 ⁵	69.6 ¹⁶	36.73 ⁷	43.4 ¹⁷	16.25 ¹¹	16.7 ²²	50.22 ¹⁰	14.8 ²¹
	²	¹⁹	³	¹⁸	⁷	²³	⁷	²²
20.1	17.98	67.7	36.70	41.6	16.18	14.4	50.15	12.6
Mar. 2.0	17.99 ¹	65.6 ²¹	36.70 ⁰	39.8 ¹⁸	16.15 ³	12.0 ²⁴	50.13 ²	10.3 ²³
12.0	18.04 ⁵	63.2 ²⁴	36.74 ⁴	38.1 ¹⁷	16.18 ³	9.7 ²³	50.16 ³	8.1 ²²
22.0	18.14 ¹⁰	60.7 ²⁵	36.82 ⁸	36.6 ¹⁵	16.26 ⁸	7.5 ²²	50.24 ⁸	6.1 ²⁰
Apr. 1.0	18.28 ¹⁴	58.0 ²⁷	36.95 ¹³	35.4 ¹²	16.40 ¹⁴	5.5 ²⁰	50.37 ¹³	4.3 ¹⁸
	¹⁸	²⁸	¹⁸	⁸	²⁰	¹⁶	¹⁹	¹⁵
10.9	18.46	55.2	37.13	34.6	16.60	3.9	50.56	2.8
20.9	18.69 ²³	52.4 ²⁸	37.35 ²²	34.2 ⁴	16.85 ²⁵	2.7 ¹²	50.80 ²⁴	1.8 ¹⁰
30.9	18.96 ²⁷	49.6 ²⁸	37.61 ²⁶	34.1 ¹	17.15 ³⁰	2.0 ⁷	51.09 ²⁹	1.2 ⁶
May 10.8	19.27 ³¹	46.9 ²⁷	37.91 ³⁰	34.5 ⁴	17.49 ³⁴	1.8 ²	51.42 ³³	1.1 ¹
20.8	19.61 ³⁴	44.4 ²⁵	38.23 ³²	35.3 ⁸	17.87 ³⁸	2.1 ³	51.78 ³⁶	1.5 ⁴
	³⁶	²³	³⁴	¹²	⁴⁰	⁷	³⁸	⁸
30.8	19.97	42.1	38.57	36.5	18.27	2.8	52.16	2.3
June 9.8	20.35 ³⁸	40.0 ²¹	38.93 ³⁶	38.1 ¹⁶	18.68 ⁴¹	4.0 ¹²	52.56 ⁴⁰	3.6 ¹³
19.7	20.73 ³⁸	38.2 ¹⁸	39.29 ³⁶	40.1 ²⁰	19.10 ⁴²	5.7 ¹⁷	52.96 ⁴⁰	5.4 ¹⁸
29.7	21.11 ³⁸	36.8 ¹⁴	39.64 ³⁵	42.3 ²²	19.50 ⁴⁰	7.8 ²¹	53.35 ³⁹	7.5 ²¹
July 9.7	21.48 ³⁷	35.7 ¹¹	39.97 ³³	44.8 ²⁵	19.88 ³⁸	10.2 ²⁴	53.72 ³⁷	9.9 ²⁴
	³⁵	⁷	³¹	²⁶	³⁶	²⁷	³⁴	²⁷
19.7	21.83	35.0	40.28	47.4	20.24	12.9	54.06	12.6
29.6	22.15 ³²	34.8 ²	40.56 ²⁸	50.1 ²⁷	20.56 ³²	15.8 ²⁹	54.37 ³¹	15.5 ²⁹
Aug. 8.6	22.43 ²⁸	35.0 ²	40.80 ²⁴	52.9 ²⁸	20.84 ²⁸	18.9 ³¹	54.64 ²⁷	18.6 ³¹
18.6	22.67 ²⁴	35.6 ⁶	41.00 ²⁰	55.6 ²⁷	21.07 ²³	22.1 ³²	54.86 ²²	21.7 ³¹
28.5	22.86 ¹⁹	36.6 ¹⁰	41.16 ¹⁶	58.3 ²⁷	21.25 ¹⁸	25.3 ³²	55.04 ¹⁸	24.8 ³¹
	¹³	¹³	¹²	²⁶	¹³	³²	¹³	³¹
Sept. 7.5	22.99	37.9	41.28	60.9	21.38	28.5	55.17	27.9
17.5	23.07 ⁸	39.4 ¹⁵	41.35 ⁷	63.3 ²⁴	21.46 ⁸	31.6 ³¹	55.25 ⁸	30.9 ³⁰
27.5	23.10 ³	41.1 ¹⁷	41.38 ³	65.5 ²²	21.48 ²	34.5 ²⁹	55.28 ³	33.7 ²⁸
Oct. 7.4	23.09 ¹	42.9 ¹⁸	41.37 ¹	67.5 ²⁰	21.46 ²	37.2 ²⁷	55.26 ²	36.2 ²⁵
17.4	23.03 ⁶	44.7 ¹⁸	41.33 ⁴	69.2 ¹⁷	21.40 ⁶	39.7 ²⁵	55.21 ⁵	38.5 ²³
	¹⁰	¹⁸	⁷	¹⁴	⁹	²¹	⁹	²⁰
27.4	22.93	46.5	41.26	70.6	21.31	41.8	55.12	40.5
Nov. 6.4	22.81 ¹²	48.1 ¹⁶	41.17 ⁹	71.7 ¹¹	21.18 ¹³	43.6 ¹⁸	55.00 ¹²	42.2 ¹⁷
16.3	22.67 ¹⁴	49.5 ¹⁴	41.06 ¹¹	72.5 ⁸	21.02 ¹⁶	45.0 ¹⁴	54.86 ¹⁴	43.5 ¹³
26.3	22.51 ¹⁶	50.6 ¹¹	40.93 ¹³	72.9 ⁴	20.84 ¹⁸	45.9 ⁹	54.70 ¹⁶	44.3 ⁸
Dec. 6.3	22.34 ¹⁷	51.4 ⁸	40.80 ¹³	73.0 ¹	20.65 ¹⁹	46.3 ⁴	54.53 ¹⁷	44.7 ⁴
	¹⁶	⁵	¹⁴	³	²⁰	⁰	¹⁸	¹
16.2	22.18	51.9	40.66	72.7	20.45	46.3	54.35	44.6
26.2	22.03 ¹⁵	52.0 ¹	40.52 ¹⁴	72.0 ⁷	20.25 ²⁰	45.8 ⁵	54.16 ¹⁹	44.1 ¹
36.2	21.89 ¹⁴	51.7 ³	40.39 ¹³	71.0 ¹⁰	20.06 ¹⁹	44.9 ⁹	53.98 ¹⁸	43.2 ¹
Sec δ , Tan δ	1.274	-0.790	1.165	+0.597	1.439	+1.035	1.363	+0.926
Mean Place	18 ^h .557	58 ^m .85	38 ^h .045	42 ^m .42	18 ^h .116	12 ^m .25	51 ^h .928	10 ^m .90
D' ψ α , D ω α	0.00	+0.05	0.00	-0.04	0.00	-0.07	0.00	-0.06
D ψ δ , D ω δ	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Piscium. Mag. 4.3			♍ Cephei. Mag. 3.4			♎ Andromedæ. Mag. 4.3			♐ Aquarii. Mag. 4.6		
	Right Ascension.		Declination N.	Right Ascension.		Declination N.	Right Ascension.		Declination N.	Right Ascension.		Declination S.
	h	m	° ' "	h	m	° ' "	h	m	° ' "	h	m	° ' "
	23	35	+ 5 9	23	35	+77 8	23	36	+43 50	23	38	-15 1
	s		"	s		"	s		"	s		"
Jan. 1.2	27.96		15.5 8	41.85	86	65.7 9	5.99	18	78.4 12	12.37	10	41.4 2
11.2	27.87	9	14.7 8	40.99	80	64.8 9	5.81	16	77.2 15	12.27	8	41.6 1
21.1	27.79	8	13.9 8	40.19	70	63.4 14	5.65	14	75.7 18	12.19	6	41.7 1
31.1	27.73	6	13.2 7	39.49	58	61.5 19	5.51	11	73.9 21	12.13	4	41.6 4
Feb. 10.1	27.69	4	12.5 7	38.91	44	59.1 24	5.40	7	71.8 23	12.09	2	41.2 6
		2	6			28						
20.1	27.67		11.9	38.47		56.3	5.33		69.5	12.07		40.6
Mar. 2.0	27.68	1	11.5 4	38.20	27	53.3 30	5.30	3	67.2 23	12.08	1	39.8 8
12.0	27.73	5	11.3 2	38.11	9	50.3 30	5.32	2	65.0 22	12.13	5	38.8 10
22.0	27.81	8	11.3 0	38.21	10	47.3 30	5.40	8	62.9 21	12.21	8	37.5 13
Apr. 1.0	27.93	12	11.6 3	38.49	28	44.4 29	5.54	14	61.1 18	12.33	12	36.0 15
		16	6		46	26		19			15	17
10.9	28.09		12.2	38.95		41.8	5.73		59.6	12.48		34.3
20.9	28.28	19	13.1 9	39.57	62	39.6 22	5.97	24	58.5 11	12.67	19	32.4 19
30.9	28.51	23	14.2 11	40.33	76	37.8 18	6.26	29	57.8 7	12.90	23	30.4 20
May 10.8	28.77	26	15.6 14	41.20	87	36.5 13	6.59	33	57.6 2	13.16	26	28.3 21
20.8	29.06	29	17.2 16	42.16	96	35.8 7	6.95	36	57.9 3	13.45	29	26.1 22
		31	18		102	1		39			31	22
30.8	29.37		19.0	43.18		35.7	7.34		58.7	13.76		23.9
June 9.8	29.69	32	21.0 20	44.22	104	36.1 4	7.74	40	60.0 13	14.09	32	21.7 22
19.7	30.01	32	23.1 21	45.26	104	37.1 10	8.14	40	61.7 17	14.42	32	19.6 21
29.7	30.33	32	25.2 21	46.27	101	38.7 16	8.54	40	63.8 21	14.75	32	17.7 19
July 9.7	30.64	31	27.3 21	47.22	95	40.8 21	8.92	38	66.2 24	15.07	32	16.0 17
		29	21		87	25		35			30	15
19.7	30.93		29.4	48.09		43.3	9.27		68.9	15.37		14.5
29.6	31.20	27	31.4 20	48.86	77	46.2 29	9.59	32	71.8 29	15.65	27	13.2 13
Aug. 8.6	31.44	24	33.2 18	49.51	65	49.5 33	9.86	27	74.9 31	15.90	24	12.2 10
18.6	31.64	20	34.9 17	50.04	53	53.0 35	10.09	23	78.0 31	16.11	20	11.6 6
28.5	31.80	16	36.3 14	50.43	39	56.7 37	10.27	18	81.2 32	16.28	16	11.3 3
		12	12		24	38		13			13	1
Sept. 7.5	31.92		37.5	50.67		60.5	10.40		84.3	16.41		11.2
17.5	32.00	8	38.5 10	50.77	10	64.4 39	10.48	8	87.3 30	16.49	8	11.4 2
27.5	32.04	4	39.2 7	50.72	5	68.2 38	10.51	3	90.1 28	16.54	4	11.9 5
Oct. 7.4	32.05	1	39.7 5	50.53	19	71.9 37	10.50	1	92.7 26	16.55	1	12.6 7
17.4	32.03	2	40.0 3	50.20	33	75.4 35	10.45	5	95.1 24	16.52	2	13.4 8
		4	1		45	32		9			5	9
27.4	31.99		40.1	49.75		78.6	10.36		97.2	16.47		14.3
Nov. 6.4	31.92	7	40.0 1	49.18	57	81.5 29	10.24	12	98.9 17	16.40	7	15.2 9
16.3	31.84	8	39.8 2	48.50	68	83.9 24	10.10	14	100.2 13	16.31	8	16.1 9
26.3	31.75	9	39.4 4	47.73	77	85.9 20	9.94	16	101.1 9	16.21	9	17.0 9
Dec. 6.3	31.65	10	38.9 5	46.90	83	87.3 14	9.76	18	101.6 5	16.10	10	17.8 8
		11	6		87	8		19			11	7
16.2	31.54		38.3	46.03		88.1	9.57		101.6	15.99		18.5
26.2	31.44	10	37.6 7	45.14	89	88.2 1	9.38	19	101.1 5	15.89	10	19.0 5
36.2	31.35	9	36.9 7	44.26	88	87.7 5	9.20	18	100.2 9	15.79	9	19.4 4
Sec δ, Tan δ	1.004		+0.090	4.497		+4.384	1.387		+0.961	1.035		-0.268
Mean Place	28°.488		16''.79	46°.103		48''.46	7°.144		67''.48	12°.692		33''.33
D'♂ a, D♂ a	0.00		-0.01	-0.01		-0.29	0.00		-0.06	0.00		+0.02
D'♂ δ, D♂ δ	+0.4		-0.1	+0.4		-0.1	+0.4		-0.1	+0.4		-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ^1 Aquarii. Mag. 5.3		ψ Andromedæ. Mag. 5.1		41 H. Cephei. Mag. 5.0		δ Sculptoris. Mag. 4.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination S.
	h m 23 39 s	° ' -18 45 "	h m 23 41 s	° ' +45 56 "	h m 23 43 s	° ' +67 19 "	h m 23 44 s	° ' -28 36 "
Jan. 1.2	41.15	45.0	41.94	25.5	42.27	40.3	23.56	54.4
11.2	41.06 9	45.1 1	41.75 19	24.4 11	41.82 45	39.4 9	23.45 11	54.3 1
21.2	40.98 8	45.0 1	41.57 18	22.9 15	41.40 42	38.0 14	23.35 10	53.9 4
31.1	40.91 7	44.7 3	41.41 16	21.1 18	41.03 37	36.1 19	23.27 8	53.2 7
Feb. 10.1	40.86 5 2	44.1 6 8	41.29 12 8	19.0 21 23	40.72 31 23	33.8 23 27	23.21 6 3	52.1 11 14
20.1	40.84	43.3	41.21	16.7	40.49	31.1	23.18	50.7
Mar. 2.0	40.85 1	42.3 10	41.17 4	14.3 24	40.35 14	28.2 29	23.18 0	49.1 16
12.0	40.89 4	41.1 12	41.19 2	12.0 23	40.31 4	25.3 29	23.22 4	47.3 18
22.0	40.97 8	39.6 15	41.26 7	9.8 22	40.38 7	22.4 29	23.29 7	45.3 20
Apr. 1.0	41.09 12 16	37.9 17 19	41.39 13 19	7.9 19 16	40.55 17 28	19.7 27 24	23.40 11 16	43.1 22 24
10.9	41.25 19	36.0 21	41.58 24	6.3 12	40.83 38	17.3 20	23.56 20	40.7 25
20.9	41.44 23	33.9 22	41.82 29	5.1 8	41.21 46	15.3 16	23.76 23	38.2 26
30.9	41.67 26	31.7 22	42.11 33	4.3 3	41.67 53	13.7 11	23.99 27	35.6 26
May 10.9	41.93 29 31	29.5 23 22	42.44 37 40	4.0 2 7	42.20 59 63	12.6 5 0	24.26 30 33	33.0 25 24
20.8	42.22 31	27.2 22	42.81 40	4.2 7	42.79 63	12.1 0	24.56 33	30.5 24
30.8	42.53 33	25.0 22	43.21 41	4.9 11	43.42 65	12.1 6	24.89 35	28.1 22
June 9.8	42.86 34	22.8 21	43.62 41	6.0 16	44.07 65	12.7 11	25.24 35	25.9 20
19.7	43.20 33	20.7 19	44.03 41	7.6 20	44.72 64	13.8 17	25.59 35	23.9 17
29.7	43.53 33	18.8 16	44.44 39	9.6 24	45.36 61	15.5 21	25.94 35	22.2 15
July 9.7	43.86 31	17.2 14	44.83 36	12.0 27	45.97 56	17.6 26	26.29 33	20.7 11
19.7	44.17 28	15.8 11	45.19 33	14.7 29	46.53 51	20.2 30	26.62 30	19.6 7
29.6	44.45 25	14.7 8	45.52 29	17.6 31	47.04 44	23.2 32	26.92 27	18.9 3
Aug. 8.6	44.70 21	13.9 5	45.81 24	20.7 31	47.48 36	26.4 34	27.19 23	18.6 0
18.6	44.91 18	13.4 1	46.05 19	23.8 32	47.84 28	29.8 36	27.42 19	18.6 4
28.6	45.09 13	13.3 2	46.24 14	27.0 32	48.12 20	33.4 37	27.61 14	19.0 7
Sept. 7.5	45.22 9	13.5 4	46.38 9	30.2 31	48.32 11	37.1 37	27.75 10	19.7 10
17.5	45.31 5	13.9 6	46.47 4	33.3 29	48.43 2	40.8 37	27.85 5	20.7 12
27.5	45.36 1	14.5 9	46.51 0	36.2 27	48.45 6	44.5 35	27.90 1	21.9 14
Oct. 7.4	45.37 2	15.4 10	46.51 5	38.9 25	48.39 13	48.0 33	27.91 3	23.3 15
17.4	45.35 6	16.4 10	46.46 8	41.4 22	48.26 21	51.3 30	27.88 6	24.8 15
27.4	45.29 8	17.4 11	46.38 12	43.6 18	48.05 28	54.3 27	27.82 9	26.3 14
Nov. 6.4	45.21 9	18.5 11	46.26 15	45.4 15	47.77 33	57.0 22	27.73 11	27.7 13
16.3	45.12 11	19.6 10	46.11 17	46.9 10	47.44 38	59.2 17	27.62 12	29.0 12
26.3	45.01 11	20.6 8	45.94 18	47.9 6	47.06 42	60.9 12	27.50 13	30.2 9
Dec. 6.3	44.90 11	21.4 7	45.76 19	48.5 1	46.64 45	62.1 7	27.37 13	31.1 7
16.3	44.79 11	22.1 5	45.57 20	48.6 4	46.19 46	62.8 1	27.24 13	31.8 4
26.2	44.68 10	22.6 3	45.37 20	48.2 9	45.73 45	62.9 6	27.11 12	32.2 1
36.2	44.58	22.9	45.17	47.3	45.28	62.3	26.99	32.3
Sec δ , Tan δ	1.056	-0.340	1.438	+1.033	2.594	+2.394	1.139	-0.545
Mean Place	41 ^s .439	35 ^{''} .77	43 ^s .112	13 ^{''} .69	44 ^s .573	23 ^{''} .95	23 ^s .729	42 ^{''} .35
D' ψ α , D ω α	0.00	+0.02	0.00	-0.07	0.00	-0.16	0.00	+0.04
D ψ δ , D ω δ	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1	+0.4	-0.1

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ^1 Octantis. Mag. 5.1		ϕ Pegasi. Mag. 5.2		ρ Cassiopeiae. Mag. 4.8		Groombridge 4163. Mag. 6.6	
	Right Ascension.	Declination S.	Right Ascension.	Declination N.	Right Ascension.	Declination N.	Right Ascension.	Declination N.
	h m 23 46 s	° ' - -82 29 "	h m 23 48 s	° ' + +18 38 "	h m 23 49 s	° ' + +57 0 "	h m 23 50 s	° ' + +73 55 "
Jan. 1.2	63.75	89.5	2.97	17.3	60.27	70.2	31.83	51.8
11.2	62.34 ¹⁴¹	87.7 ¹⁸	2.87 ¹⁰	16.4 ⁹	59.99 ²⁸	69.3 ⁹	31.15 ⁶⁸	51.1 ⁷
21.2	61.08 ¹²⁶	85.4 ²³	2.77 ¹⁰	15.3 ¹¹	59.72 ²⁷	67.9 ¹⁴	30.51 ⁶⁴	49.8 ¹³
31.1	60.00 ¹⁰⁸	82.6 ²⁸	2.69 ⁸	14.1 ¹²	59.48 ²⁴	66.0 ¹⁹	29.94 ⁵⁷	48.0 ¹⁸
Feb. 10.1	59.13 ⁸⁷	79.4 ³²	2.63 ⁶	12.9 ¹²	59.29 ¹⁹	63.8 ²²	29.46 ⁴⁸	45.8 ²²
	65 ³⁵		4 ¹²		14 ²⁵		37 ²⁶	
20.1	58.48	75.9	2.59	11.7	59.15	61.3	29.09	43.2
Mar. 2.0	58.07 ⁴¹	72.2 ³⁷	2.58 ¹	10.6 ¹¹	59.07 ⁸	58.7 ²⁶	28.84 ²⁵	40.3 ²⁹
12.0	57.91 ¹⁶	68.3 ³⁹	2.61 ³	9.6 ¹⁰	59.05 ²	56.0 ²⁷	28.74 ¹⁰	37.3 ³⁰
22.0	58.01 ¹⁰	64.4 ³⁹	2.67 ⁶	8.8 ⁸	59.10 ⁵	53.4 ²⁶	28.78 ⁴	34.3 ³⁰
Apr. 1.0	58.36 ³⁵	60.5 ³⁹	2.77 ¹⁰	8.3 ⁵	59.23 ¹³	51.0 ²⁴	28.98 ²⁰	31.4 ²⁹
	59 ³⁸		15 ²		21 ²¹		34 ²⁶	
10.9	58.95 ⁸²	56.7 ³⁶	2.92 ¹⁹	8.1 ¹	59.44 ²⁸	48.9 ¹⁷	29.32 ⁴⁷	28.8 ²³
20.9	59.77 ¹⁰⁴	53.1 ³³	3.11 ²³	8.2 ⁵	59.72 ³⁴	47.2 ¹³	29.79 ⁵⁹	26.5 ¹⁸
30.9	60.81 ¹²⁴	49.8 ³⁰	3.34 ²⁷	8.7 ⁸	60.06 ⁴⁰	45.9 ⁸	30.38 ⁶⁹	24.7 ¹³
May 10.9	62.05 ¹⁴¹	46.8 ²⁶	3.61 ²⁹	9.5 ¹¹	60.46 ⁴⁴	45.1 ³	31.07 ⁷⁸	23.4 ⁸
20.8	63.46 ¹⁵⁴	44.2 ²²	3.90 ³¹	10.6 ¹⁴	60.90 ⁴⁷	44.8 ³	31.85 ⁸³	22.6 ³
30.8	65.00 ¹⁶⁴	42.0 ¹⁷	4.21 ³³	12.0 ¹⁷	61.37 ⁴⁹	45.1 ⁸	32.68 ⁸⁶	22.3 ³
June 9.8	66.64 ¹⁷¹	40.3 ¹¹	4.54 ³⁴	13.7 ²⁰	61.86 ⁵⁰	45.9 ¹³	33.54 ⁸⁷	22.6 ⁹
19.7	68.35 ¹⁷³	39.2 ⁶	4.88 ³³	15.7 ²²	62.36 ⁴⁹	47.2 ¹⁸	34.41 ⁸⁵	23.5 ¹⁵
29.7	70.08 ¹⁷⁰	38.6 ⁰	5.21 ³²	17.9 ²³	62.85 ⁴⁷	49.0 ²²	35.26 ⁸¹	25.0 ¹⁹
July 9.7	71.78 ¹⁶²	38.6 ⁶	5.53 ³¹	20.2 ²³	63.32 ⁴⁴	51.2 ²⁶	36.07 ⁷⁶	26.9 ²⁴
19.7	73.40 ¹⁵⁰	39.2 ¹¹	5.84 ²⁸	22.5 ²⁴	63.76 ⁴⁰	53.8 ²⁹	36.83 ⁶⁸	29.3 ²⁸
29.6	74.90 ¹³³	40.3 ¹⁶	6.12 ²⁵	24.9 ²³	64.16 ³⁵	56.7 ³¹	37.51 ⁵⁹	32.1 ³²
Aug. 8.6	76.23 ¹¹²	41.9 ²¹	6.37 ²¹	27.2 ²³	64.51 ³⁰	59.8 ³³	38.10 ⁴⁹	35.3 ³⁴
18.6	77.35 ⁸⁷	44.0 ²⁵	6.58 ¹⁷	29.5 ²¹	64.81 ²⁴	63.1 ³⁵	38.59 ³⁸	38.7 ³⁶
28.6	78.22 ⁶⁰	46.5 ²⁷	6.75 ¹³	31.6 ²⁰	65.05 ¹⁷	66.6 ³⁵	38.97 ²⁷	42.3 ³⁸
Sept. 7.5	78.82 ³⁰	49.2 ²⁹	6.88 ⁹	33.6 ¹⁸	65.22 ¹¹	70.1 ³⁴	39.24 ¹⁶	46.1 ³⁸
17.5	79.12 ¹	52.1 ³⁰	6.97 ⁶	35.4 ¹⁵	65.33 ⁵	73.5 ³³	39.40 ⁴	49.9 ³⁸
27.5	79.11 ³²	55.1 ³⁰	7.03 ²	36.9 ¹³	65.38 ¹	76.8 ³²	39.44 ⁸	53.7 ³⁷
Oct. 7.4	78.79 ⁶²	58.1 ²⁸	7.05 ¹	38.2 ¹¹	65.37 ⁶	80.0 ³⁰	39.36 ¹⁹	57.4 ³⁵
17.4	78.17 ⁸⁹	60.9 ²⁵	7.04 ⁴	39.3 ⁹	65.31 ¹²	83.0 ²⁷	39.17 ³⁰	60.9 ³²
27.4	77.28 ¹¹³	63.4 ²²	7.00 ⁶	40.2 ⁶	65.19 ¹⁶	85.7 ²³	38.87 ⁴⁰	64.1 ²⁹
Nov. 6.4	76.15 ¹³²	65.6 ¹⁷	6.94 ⁸	40.8 ³	65.03 ²⁰	88.0 ²⁰	38.47 ⁴⁸	67.0 ²⁵
16.3	74.83 ¹⁴⁶	67.3 ¹¹	6.86 ¹⁰	41.1 ¹	64.83 ²³	90.0 ¹⁵	37.99 ⁵⁶	69.5 ²⁰
26.3	73.37 ¹⁵⁵	68.4 ⁵	6.76 ¹¹	41.2 ²	64.60 ²⁶	91.5 ¹⁰	37.43 ⁶²	71.5 ¹⁵
Dec. 6.3	71.82 ¹⁵⁹	68.9 ¹	6.65 ¹¹	41.0 ⁴	64.34 ²⁸	92.5 ⁴	36.81 ⁶⁶	73.0 ⁹
16.3	70.23 ¹⁵⁶	68.8 ⁸	6.54 ¹¹	40.6 ⁶	64.06 ²⁹	92.9 ¹	36.15 ⁶⁸	73.9 ³
26.2	68.67 ¹⁴⁹	68.0 ¹⁴	6.43 ¹¹	40.0 ⁸	63.77 ²⁸	92.8 ⁶	35.47 ⁶⁸	74.2 ³
36.2	67.18	66.6	6.32	39.2	63.49	92.2	34.79	73.9
Sec δ , Tan δ	7.663	-7.597	1.055	+0.337	1.837	+1.541	3.612	+3.471
Mean Place	61 ^s .961	68 ^{''} .43	3 ^s .588	13 ^{''} .48	61 ^s .785	55 ^{''} .37	34 ^s .945	34 ^{''} .13
D ['] ϕ α , D ω α	+0.01	+0.51	0.00	-0.02	0.00	-0.10	0.00	-0.23
D ['] ϕ δ , D ω δ	+0.4	-0.1	+0.4	-0.1	+0.4	0.0	+0.4	0.0

FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♊ Piscium. Mag. 4.0		♌ Tucanæ. Mag. 4.7		♐ Piscium. Mag. 4.7		♑ Ceti. Mag. 4.6	
	Right Ascension.	Declination N.	Right Ascension.	Declination S.	Right Ascension.	Declination S.	Right Ascension.	Declination S.
	h m 23 54 s	° ' + 6 22 "	h m 23 55 s	° ' -66 3 "	h m 23 57 s	° ' - 6 29 "	h m 23 59 s	° ' -17 48 "
Jan. 1.2	50.15	54.0	24.71	58.9	29.61	55.8	16.86	81.6
11.2	50.05 10	53.3 7	24.33 38	57.7 12	29.52 9	56.3 5	16.76 10	81.9 3
21.2	49.96 9	52.5 8	23.98 35	56.0 17	29.44 8	56.7 4	16.67 9	81.9 0
31.1	49.89 7	51.8 7	23.68 30	53.8 22	29.37 7	56.9 2	16.59 8	81.7 2
Feb. 10.1	49.83 6	51.1 7	23.44 24	51.2 26	29.31 6	57.0 1	16.53 6	81.2 5
	3	6	17	30	4	1	4	7
20.1	49.80	50.5	23.27	48.2	29.27	56.9	16.49	80.5
Mar. 2.1	49.79 1	50.1 4	23.17 10	44.9 33	29.26 1	56.6 3	16.48 1	79.5 10
12.0	49.81 2	49.8 3	23.14 3	41.4 35	29.28 2	56.1 5	16.50 2	78.3 12
22.0	49.87 6	49.8 0	23.19 5	37.8 36	29.34 6	55.3 8	16.56 6	76.9 14
Apr. 1.0	49.97 10	50.0 2	23.32 13	34.1 37	29.44 10	54.3 10	16.65 9	75.3 16
	14	5	22	37	13	12	13	19
10.9	50.11	50.5	23.54	30.4	29.57	53.1	16.78	73.4
20.9	50.28 17	51.3 8	23.84 30	26.8 36	29.74 17	51.6 15	16.95 17	71.3 21
30.9	50.50 22	52.3 10	24.21 37	23.4 34	29.95 21	49.9 17	17.16 21	69.1 22
May 10.9	50.75 25	53.6 13	24.66 45	20.2 32	30.19 24	48.1 18	17.41 25	66.9 22
20.8	51.03 28	55.2 16	25.17 51	17.4 28	30.47 28	46.1 20	17.69 28	64.6 23
	30	18	56	25	30	21	30	23
30.8	51.33	57.0	25.73	14.9	30.77	44.0	17.99	62.3
June 9.8	51.65 32	58.9 19	26.33 60	12.8 21	31.09 32	41.9 21	18.31 32	60.0 23
19.8	51.97 32	60.9 20	26.95 62	11.2 16	31.41 32	39.8 21	18.64 33	57.8 22
29.7	52.29 32	63.0 21	27.58 63	10.1 11	31.73 32	37.7 21	18.98 34	55.8 20
July 9.7	52.61 32	65.2 22	28.20 62	9.6 5	32.05 32	35.7 20	19.31 33	54.1 17
	30	21	60	0	31	18	32	15
19.7	52.91	67.3	28.80	9.6	32.36	33.9	19.63	52.6
29.6	53.19 28	69.3 20	29.36 56	10.1 5	32.64 28	32.3 16	19.92 29	51.4 12
Aug. 8.6	53.44 25	71.2 19	29.86 50	11.2 11	32.89 25	30.9 14	20.18 26	50.5 9
18.6	53.65 21	72.9 17	30.29 43	12.8 16	33.11 22	29.8 11	20.41 23	49.9 6
28.6	53.83 18	74.4 15	30.64 35	14.8 20	33.29 18	29.0 8	20.60 19	49.6 3
	14	13	26	23	14	6	15	1
Sept. 7.5	53.97	75.7	30.90	17.1	33.43	28.4	20.75	49.7
17.5	54.07 10	76.8 11	31.06 16	19.7 26	33.54 11	28.1 3	20.86 11	50.1 4
27.5	54.13 6	77.6 8	31.12 6	22.4 27	33.61 7	28.0 1	20.93 7	50.7 6
Oct. 7.5	54.16 3	78.2 6	31.08 4	25.2 28	33.64 3	28.2 2	20.96 3	51.5 8
17.4	54.16 0	78.6 4	30.95 13	27.9 27	33.63 1	28.6 4	20.95 1	52.5 10
	3	2	21	26	3	5	4	11
27.4	54.13	78.8	30.74	30.5	33.60	29.1	20.91	53.6
Nov. 6.4	54.08 5	78.8 0	30.45 29	32.8 23	33.55 5	29.7 6	20.85 6	54.7 11
16.3	54.01 7	78.6 2	30.10 35	34.7 19	33.48 7	30.4 7	20.77 8	55.8 11
26.3	53.92 9	78.3 3	29.71 39	36.1 14	33.39 9	31.1 7	20.68 9	56.8 10
Dec. 6.3	53.83 9	77.9 4	29.29 42	37.0 9	33.30 9	31.9 8	20.58 10	57.7 9
	10	6	43	3	10	7	11	8
16.3	53.73	77.3	28.86	37.3	33.20	32.6	20.47	58.5
26.2	53.63 10	76.6 7	28.44 42	37.1 2	33.10 10	33.2 6	20.35 12	59.1 6
36.2	53.53 10	75.9 7	28.04 40	36.3 8	33.00 10	33.7 5	20.24 11	59.5 4
Sec δ, Tan δ	1.006	+0.112	2.464	-2.252	1.006	-0.114	1.050	-0.321
Mean Place	50°.579	54''.19	24°.185	39''.16	29°.905	51''.23	17°.038	73''.35
D'ψ a, Dω a	0.00	-0.01	0.00	+0.15	0.00	+0.01	0.00	+0.02
Dψ δ, Dω δ	+0.4	0.0	+0.4	0.0	+0.4	0.0	+0.4	0.0

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Jan.	h m 1 42	° ' -85 12	Jan.	h m 5 47	° ' -84 49	Jan.	h m 7 17	° ' -86 53	Jan.	h m 9 9	° ' -85 18	Jan.	h m 10 59	° ' -84 7
	s "	"		s "	"		s "	"		s "	"		s "	"
0.3	28.39	50.53	0.5	17.06	47.93	0.5	63.17	28.48	0.6	38.75	39.94	0.7	56.87	11.88
1.3	28.09	50.59	1.5	16.96	48.30	1.5	63.17	28.88	1.6	38.91	40.29	1.7	57.08	12.11
2.3	27.79	50.63	2.5	16.84	48.68	2.5	63.15	29.28	2.6	39.05	40.66	2.7	57.31	12.37
3.3	27.48	50.64	3.5	16.70	49.05	3.5	63.11	29.69	3.6	39.17	41.04	3.7	57.53	12.65
4.3	27.18	50.62	4.5	16.55	49.40	4.5	63.04	30.09	4.6	39.27	41.43	4.7	57.72	12.95
5.3	26.88	50.59	5.4	16.40	49.72	5.5	62.94	30.46	5.6	39.36	41.81	5.7	57.90	13.24
6.3	26.61	50.55	6.4	16.25	50.01	6.5	62.84	30.82	6.6	39.44	42.18	6.7	58.06	13.53
7.3	26.35	50.49	7.4	16.10	50.29	7.5	62.73	31.16	7.6	39.51	42.53	7.7	58.21	13.82
8.3	26.10	50.43	8.4	15.96	50.55	8.5	62.62	31.49	8.6	39.57	42.86	8.7	58.35	14.09
9.3	25.85	50.39	9.4	15.82	50.81	9.5	62.51	31.80	9.6	39.63	43.19	9.7	58.49	14.35
10.3	25.61	50.35	10.4	15.69	51.07	10.5	62.42	32.10	10.6	39.70	43.51	10.7	58.64	14.60
11.3	25.37	50.31	11.4	15.56	51.34	11.5	62.35	32.41	11.6	39.78	43.82	11.6	58.79	14.85
12.3	25.13	50.28	12.4	15.43	51.62	12.5	62.28	32.74	12.6	39.87	44.14	12.6	58.95	15.10
13.3	24.87	50.26	13.4	15.30	51.91	13.5	62.21	33.08	13.6	39.96	44.48	13.6	59.12	15.36
14.3	24.60	50.25	14.4	15.17	52.22	14.5	62.14	33.44	14.6	40.05	44.83	14.6	59.29	15.63
15.3	24.31	50.23	15.4	15.02	52.54	15.5	62.05	33.82	15.6	40.14	45.21	15.6	59.47	15.91
16.2	24.02	50.19	16.4	14.85	52.87	16.5	61.95	34.21	16.6	40.23	45.61	16.6	59.65	16.22
17.2	23.71	50.13	17.4	14.67	53.19	17.5	61.80	34.61	17.6	40.30	46.02	17.6	59.82	16.56
18.2	23.40	50.03	18.4	14.47	53.50	18.5	61.61	35.01	18.6	40.34	46.44	18.6	59.98	16.93
19.2	23.10	49.91	19.4	14.25	53.79	19.5	61.41	35.39	19.6	40.36	46.87	19.6	60.12	17.30
20.2	22.81	49.76	20.4	14.02	54.04	20.5	61.17	35.74	20.5	40.36	47.28	20.6	60.25	17.68
21.2	22.54	49.60	21.4	13.80	54.26	21.5	60.92	36.06	21.5	40.34	47.67	21.6	60.35	18.04
22.2	22.29	49.44	22.4	13.59	54.48	22.5	60.69	36.37	22.5	40.32	48.04	22.6	60.44	18.38
23.2	22.05	49.30	23.4	13.39	54.68	23.5	60.47	36.66	23.5	40.30	48.39	23.6	60.54	18.71
24.2	21.82	49.16	24.4	13.20	54.88	24.5	60.28	36.95	24.5	40.30	48.72	24.6	60.64	19.03
25.2	21.59	49.04	25.4	13.02	55.10	25.5	60.10	37.25	25.5	40.31	49.06	25.6	60.75	19.33
26.2	21.34	48.95	26.4	12.85	55.35	26.5	59.94	37.56	26.5	40.33	49.40	26.6	60.88	19.63
27.2	21.08	48.86	27.4	12.66	55.60	27.5	59.77	37.90	27.5	40.37	49.77	27.6	61.02	19.95
28.2	20.80	48.75	28.4	12.46	55.87	28.4	59.58	38.27	28.5	40.41	50.17	28.6	61.17	20.29
29.2	20.51	48.63	29.4	12.25	56.15	29.4	59.37	38.64	29.5	40.43	50.59	29.6	61.31	20.65
30.2	20.21	48.48	30.4	12.02	56.43	30.4	59.13	39.01	30.5	40.44	51.02	30.6	61.44	21.03
31.2	19.92	48.31	31.4	11.78	56.69	31.4	58.87	39.37	31.5	40.43	51.46	31.6	61.56	21.43
32.2	19.63	48.13	32.4	11.53	56.92	32.4	58.58	39.72	32.5	40.39	51.89	32.6	61.66	21.83
11.99 -11.94			11.10 -11.05			18.45 -18.42			12.24 -12.20			9.76 -9.71		
1 ^h 42 ^m 17 ^s .46			5 ^h 47 ^m 1 ^s .50			7 ^h 17 ^m 41 ^s .19			9 ^h 9 ^m 30 ^s .42			10 ^h 59 ^m 56 ^s .70		
-85° 12' 33''.92			-84° 49' 51''.91			-86° 53' 40''.29			-85° 18' 58''.68			-84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Feb.	h m 1 42	° ' -85 12	Feb.	h m 5 47	° ' -84 49	Feb.	h m 7 17	° ' -86 53	Feb.	h m 9 9	° ' -85 18	Feb.	h m 11 0	° ' -84 7
	s "			s "			s "			s "			s "	
1.2	19.63	48.13	1.4	11.53	56.92	1.4	58.58	39.72	1.5	40.39	51.89	1.6	1.66	21.83
2.2	19.36	47.92	2.4	11.27	57.12	2.4	58.28	40.05	2.5	40.33	52.30	2.6	1.75	22.23
3.2	19.10	47.70	3.4	11.02	57.30	3.4	57.96	40.34	3.5	40.27	52.68	3.6	1.82	22.62
4.2	18.86	47.49	4.4	10.77	57.46	4.4	57.66	40.62	4.5	40.20	53.05	4.6	1.89	23.00
5.2	18.64	47.29	5.4	10.54	57.63	5.4	57.37	40.89	5.5	40.13	53.40	5.6	1.94	23.37
6.2	18.43	47.08	6.4	10.31	57.78	6.4	57.09	41.16	6.5	40.07	53.75	6.6	2.00	23.72
7.2	18.21	46.88	7.4	10.09	57.93	7.4	56.82	41.42	7.5	40.02	54.09	7.6	2.07	24.06
8.2	17.99	46.70	8.4	9.88	58.09	8.4	56.55	41.69	8.5	39.97	54.44	8.6	2.14	24.40
9.2	17.77	46.52	9.4	9.67	58.27	9.4	56.30	41.96	9.5	39.92	54.78	9.6	2.22	24.74
10.2	17.54	46.34	10.4	9.45	58.47	10.4	56.05	42.25	10.5	39.89	55.14	10.6	2.30	25.08
11.2	17.29	46.17	11.3	9.23	58.66	11.4	55.79	42.56	11.5	39.85	55.52	11.6	2.39	25.44
12.2	17.03	45.98	12.3	8.99	58.86	12.4	55.51	42.89	12.5	39.81	55.92	12.6	2.48	25.83
13.2	16.75	45.77	13.3	8.72	59.07	13.4	55.21	43.22	13.5	39.76	56.33	13.6	2.57	26.24
14.2	16.48	45.54	14.3	8.44	59.27	14.4	54.86	43.55	14.5	39.69	56.76	14.6	2.65	26.65
15.2	16.22	45.28	15.3	8.15	59.45	15.4	54.49	43.86	15.5	39.59	57.19	15.6	2.71	27.09
16.2	15.97	44.99	16.3	7.86	59.60	16.4	54.10	44.15	16.5	39.47	57.61	16.6	2.75	27.53
17.2	15.73	44.69	17.3	7.56	59.72	17.4	53.69	44.41	17.5	39.33	58.00	17.5	2.78	27.96
18.2	15.52	44.39	18.3	7.27	59.82	18.4	53.28	44.65	18.5	39.18	58.36	18.5	2.79	28.38
19.2	15.33	44.09	19.3	6.99	59.90	19.4	52.87	44.87	19.5	39.04	58.71	19.5	2.79	28.78
20.2	15.15	43.80	20.3	6.73	59.97	20.4	52.50	45.07	20.5	38.91	59.04	20.5	2.79	29.16
21.2	14.96	43.54	21.3	6.48	60.05	21.4	52.15	45.29	21.5	38.79	59.36	21.5	2.80	29.52
22.1	14.77	43.30	22.3	6.23	60.16	22.4	51.82	45.52	22.5	38.69	59.68	22.5	2.83	29.88
23.1	14.57	43.07	23.3	5.99	60.29	23.4	51.50	45.77	23.5	38.60	60.02	23.5	2.87	30.24
24.1	14.35	42.83	24.3	5.73	60.42	24.4	51.17	46.04	24.5	38.51	60.39	24.5	2.92	30.62
25.1	14.12	42.58	25.3	5.46	60.57	25.4	50.83	46.32	25.5	38.41	60.78	25.5	2.97	31.02
26.1	13.88	42.31	26.3	5.17	60.72	26.4	50.45	46.60	26.4	38.30	61.18	26.5	3.01	31.44
27.1	13.64	42.02	27.3	4.87	60.85	27.4	50.04	46.88	27.4	38.17	61.57	27.5	3.04	31.88
28.1	13.41	41.71	28.3	4.57	60.96	28.4	49.62	47.15	28.4	38.02	61.97	28.5	3.05	32.32
29.1	13.19	41.38	29.3	4.27	61.03	29.4	49.18	47.38	29.4	37.85	62.34	29.5	3.04	32.76
30.1	13.00	41.04	30.3	3.96	61.09	30.4	48.73	47.60	30.4	37.67	62.70	30.5	3.02	33.18
11.98 -11.94			11.10 -11.06			18.46 -18.44			12.25 -12.20			9.77 -9.72		
1 ^h 42 ^m 17 ^s .46			5 ^h 47 ^m 1 ^s .50			7 ^h 17 ^m 41 ^s .19			9 ^h 9 ^m 30 ^s .42			10 ^h 59 ^m 56 ^s .70		
-85° 12' 33".92			-84° 49' 51".91			-86° 53' 40".29			-85° 18' 58".68			-84° 7' 33".14		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			81 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			5 Octantis. Mag. 5.4			7 Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Mar.	h m 1 42	° ' " -85 12	Mar.	h m 5 46	° ' " -84 50	Mar.	h m 7 17	° ' " -86 53	Mar.	h m 9 9	° ' " -85 19	Mar.	h m 11 0	° ' " -84 7
	s 13.19	" 41.38		s 64.27	" 1.03		s 49.18	" 47.38		s 37.85	" 2.34		s 3.04	" 32.76
1.1	13.19	41.38	1.3	64.27	1.03	1.4	49.18	47.38	1.4	37.85	2.34	1.5	3.04	32.76
2.1	13.00	41.04	2.3	63.96	1.09	2.4	48.73	47.60	2.4	37.67	2.70	2.5	3.02	33.18
3.1	12.82	40.70	3.3	63.67	1.14	3.4	48.29	47.78	3.4	37.49	3.04	3.5	3.00	33.59
4.1	12.66	40.37	4.3	63.39	1.16	4.4	47.86	47.96	4.4	37.30	3.35	4.5	2.97	33.97
5.1	12.51	40.04	5.3	63.11	1.18	5.4	47.44	48.12	5.4	37.12	3.65	5.5	2.93	34.34
6.1	12.36	39.73	6.3	62.84	1.19	6.3	47.03	48.28	6.4	36.95	3.95	6.5	2.89	34.71
7.1	12.21	39.43	7.3	62.57	1.21	7.3	46.64	48.43	7.4	36.78	4.25	7.5	2.86	35.08
8.1	12.07	39.14	8.3	62.31	1.25	8.3	46.27	48.59	8.4	36.63	4.54	8.5	2.84	35.44
9.1	11.91	38.85	9.3	62.06	1.30	9.3	45.89	48.77	9.4	36.49	4.84	9.5	2.84	35.80
10.1	11.74	38.56	10.3	61.80	1.35	10.3	45.51	48.96	10.4	36.34	5.16	10.5	2.84	36.17
11.1	11.55	38.27	11.3	61.54	1.42	11.3	45.12	49.17	11.4	36.19	5.50	11.5	2.84	36.55
12.1	11.36	37.96	12.3	61.25	1.49	12.3	44.72	49.38	12.4	36.03	5.85	12.5	2.84	36.95
13.1	11.17	37.63	13.3	60.95	1.55	13.3	44.29	49.60	13.4	35.86	6.21	13.5	2.83	37.36
14.1	10.98	37.28	14.3	60.64	1.59	14.3	43.82	49.80	14.4	35.66	6.57	14.5	2.80	37.79
15.1	10.80	36.90	15.3	60.32	1.61	15.3	43.33	49.99	15.4	35.44	6.92	15.5	2.75	38.22
16.1	10.64	36.51	16.3	60.00	1.60	16.3	42.82	50.15	16.4	35.21	7.26	16.5	2.69	38.65
17.1	10.50	36.11	17.3	59.68	1.57	17.3	42.31	50.28	17.4	34.96	7.57	17.5	2.61	39.06
18.1	10.39	35.72	18.3	59.38	1.51	18.3	41.82	50.39	18.4	34.72	7.85	18.5	2.52	39.46
19.1	10.29	35.34	19.2	59.09	1.43	19.3	41.35	50.49	19.4	34.48	8.11	19.5	2.43	39.83
20.1	10.20	34.98	20.2	58.82	1.37	20.3	40.90	50.58	20.4	34.26	8.35	20.5	2.35	40.18
21.1	10.10	34.63	21.2	58.56	1.32	21.3	40.47	50.68	21.4	34.05	8.60	21.5	2.28	40.52
22.1	9.99	34.30	22.2	58.30	1.30	22.3	40.06	50.80	22.4	33.86	8.87	22.5	2.23	40.87
23.1	9.86	33.98	23.2	58.04	1.29	23.3	39.65	50.93	23.4	33.67	9.15	23.5	2.19	41.23
24.1	9.72	33.66	24.2	57.77	1.30	24.3	39.22	51.08	24.4	33.49	9.45	24.5	2.15	41.61
25.1	9.58	33.32	25.2	57.48	1.30	25.3	38.78	51.24	25.4	33.30	9.75	25.5	2.10	42.00
26.1	9.43	32.96	26.2	57.18	1.29	26.3	38.32	51.39	26.4	33.08	10.07	26.4	2.05	42.40
27.1	9.29	32.58	27.2	56.87	1.26	27.3	37.84	51.53	27.4	32.84	10.38	27.4	1.98	42.81
28.1	9.16	32.18	28.2	56.56	1.22	28.3	37.34	51.66	28.4	32.59	10.68	28.4	1.89	43.21
29.1	9.04	31.78	29.2	56.25	1.15	29.3	36.82	51.75	29.4	32.32	10.96	29.4	1.79	43.60
30.1	8.95	31.37	30.2	55.95	1.05	30.3	36.31	51.81	30.4	32.05	11.21	30.4	1.68	43.97
31.0	8.88	30.96	31.2	55.66	0.93	31.3	35.81	51.86	31.4	31.78	11.44	31.4	1.56	44.33
32.0	8.82	30.56	32.2	55.39	0.81	32.3	35.33	51.90	32.4	31.52	11.66	32.4	1.44	44.67
11.98 -11.93 1 ^h 42 ^m 17 ^s .46 -85° 12' 33'' .92			11.11 -11.06 5 ^h 47 ^m 1 ^s .50 -84° 49' 51'' .91			18.47 -18.45 7 ^h 17 ^m 41 ^s .19 -86° 53' 40'' .29			12.25 -12.21 9 ^h 9 ^m 30 ^s .42 -85° 18' 58'' .68			9.77 -9.72 10 ^h 59 ^m 56 ^s .70 -84° 7' 33'' .14		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			81 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			77 Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Apr.	h m 1 42	° ' -85 12	Apr.	h m 5 46	° ' -84 49	Apr.	h m 7 17	° ' -86 53	Apr.	h m 9 9	° ' -85 19	Apr.	h m 10 59	° ' -84 7
	s 8.82	" 30.56		s 55.39	" 60.81		s 35.33	" 51.90		s 31.52	" 11.66		s 61.44	" 44.67
1.0	8.78	30.18	1.2	55.12	60.69	1.3	34.87	51.93	1.4	31.26	11.86	1.4	61.32	45.00
2.0	8.73	29.81	2.2	54.86	60.58	2.3	34.42	51.95	2.4	31.01	12.06	2.4	61.21	45.32
3.0	8.68	29.46	3.2	54.62	60.47	3.3	33.99	51.98	3.3	30.77	12.25	3.4	61.11	45.63
4.0														
5.0	8.63	29.11	5.2	54.38	60.37	5.3	33.57	52.02	5.3	30.54	12.44	5.4	61.01	45.93
6.0	8.56	28.77	6.2	54.14	60.29	6.3	33.16	52.08	6.3	30.32	12.65	6.4	60.92	46.24
7.0	8.48	28.43	7.2	53.89	60.22	7.3	32.73	52.15	7.3	30.11	12.88	7.4	60.84	46.57
8.0	8.39	28.08	8.2	53.63	60.16	8.3	32.29	52.23	8.3	29.89	13.12	8.4	60.76	46.92
9.0	8.30	27.71	9.2	53.35	60.08	9.3	31.83	52.30	9.3	29.66	13.37	9.4	60.67	47.28
10.0	8.21	27.32	10.2	53.07	59.98	10.3	31.35	52.38	10.3	29.41	13.61	10.4	60.57	47.64
11.0	8.13	26.92	11.2	52.78	59.87	11.2	30.84	52.43	11.3	29.14	13.86	11.4	60.46	48.01
12.0	8.07	26.50	12.2	52.48	59.74	12.2	30.31	52.47	12.3	28.85	14.09	12.4	60.32	48.37
13.0	8.03	26.07	13.2	52.19	59.57	13.2	29.78	52.46	13.3	28.55	14.29	13.4	60.17	48.71
14.0	8.01	25.63	14.2	51.91	59.39	14.2	29.26	52.44	14.3	28.24	14.47	14.4	60.00	49.03
15.0	8.01	25.20	15.2	51.65	59.20	15.2	28.77	52.40	15.3	27.93	14.62	15.4	59.84	49.34
16.0	8.02	24.80	16.2	51.40	59.00	16.2	28.30	52.35	16.3	27.64	14.76	16.4	59.68	49.63
17.0	8.03	24.42	17.2	51.17	58.81	17.2	27.86	52.30	17.3	27.37	14.88	17.4	59.53	49.90
17.9	8.04	24.06	18.2	50.95	58.64	18.2	27.44	52.27	18.3	27.12	15.02	18.4	59.40	50.17
18.9	8.02	23.72	19.2	50.73	58.49	19.2	27.03	52.26	19.3	26.88	15.16	19.4	59.28	50.45
19.9	8.00	23.38	20.2	50.50	58.36	20.2	26.62	52.26	20.3	26.64	15.32	20.4	59.17	50.74
20.9	7.97	23.03	21.2	50.25	58.24	21.2	26.18	52.28	21.3	26.40	15.50	21.4	59.06	51.04
21.9	7.93	22.66	22.2	50.00	58.11	22.2	25.72	52.29	22.3	26.14	15.69	22.4	58.94	51.35
22.9	7.89	22.26	23.2	49.74	57.97	23.2	25.25	52.30	23.3	25.86	15.88	23.4	58.80	51.67
23.9	7.86	21.85	24.2	49.47	57.81	24.2	24.76	52.30	24.3	25.56	16.06	24.4	58.65	51.99
24.9	7.85	21.43	25.1	49.20	57.62	25.2	24.26	52.27	25.3	25.27	16.22	25.4	58.49	52.30
25.9	7.87	21.01	26.1	48.95	57.40	26.2	23.76	52.21	26.3	24.97	16.36	26.4	58.32	52.59
26.9	7.90	20.61	27.1	48.70	57.16	27.2	23.28	52.13	27.3	24.66	16.46	27.4	58.14	52.86
27.9	7.94	20.21	28.1	48.47	56.92	28.2	22.81	52.03	28.3	24.35	16.55	28.4	57.95	53.11
28.9	7.99	19.82	29.1	48.25	56.68	29.2	22.36	51.91	29.3	24.05	16.63	29.4	57.76	53.35
29.9	8.06	19.44	30.1	48.05	56.44	30.2	21.93	51.78	30.3	23.77	16.69	30.4	57.59	53.57
30.9	8.12	19.09	31.1	47.86	56.20	31.2	21.52	51.67	31.3	23.50	16.75	31.3	57.43	53.78
31.9	8.18	18.75	32.1	47.67	55.98	32.2	21.12	51.59	32.3	23.24	16.82	32.3	57.26	53.99
11.97 -11.93			11.10 -11.06			18.48 -18.45			12.26 -12.22			9.78 -9.73		
1 ^h 42 ^m 17 ^s .46			5 ^h 47 ^m 1 ^s .50			7 ^h 17 ^m 41 ^s .19			9 ^h 9 ^m 30 ^s .42			10 ^h 59 ^m 56 ^s .70		
-85° 12' 33''.92			-84° 49' 51''.91			-86° 53' 40''.29			-85° 18' 58''.68			-84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			81 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			7 Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
May	h m 1 42	° ' -85 12	May	h m 5 46	° ' -84 49	May	h m 7 17	° ' -86 53	May	h m 9 9	° ' -85 19	May	h m 10 59	° ' -84 7
	s "			s "			s "			s "			s "	
1.9	8.18	18.75	1.1	47.86	56.20	1.2	21.52	51.67	1.3	23.50	16.75	1.3	57.43	53.78
2.9	8.23	18.41	2.1	47.67	55.98	2.2	21.12	51.59	2.3	23.24	16.82	2.3	57.26	53.99
3.9	8.27	18.07	3.1	47.49	55.77	3.2	20.73	51.51	3.3	22.99	16.88	3.3	57.11	54.19
4.9	8.30	17.74	4.1	47.30	55.58	4.2	20.34	51.44	4.3	22.74	16.96	4.3	56.97	54.40
5.9	8.32	17.39	5.1	47.10	55.39	5.2	19.95	51.38	5.3	22.49	17.06	5.3	56.83	54.63
6.9	8.34	17.03	6.1	46.89	55.21	6.2	19.54	51.33	6.3	22.23	17.15	6.3	56.69	54.88
7.9	8.37	16.65	7.1	46.67	55.01	7.2	19.12	51.27	7.3	21.96	17.27	7.3	56.53	55.13
8.9	8.41	16.24	8.1	46.45	54.80	8.2	18.67	51.20	8.3	21.67	17.38	8.3	56.36	55.39
9.9	8.47	15.83	9.1	46.22	54.57	9.2	18.21	51.10	9.3	21.37	17.47	9.3	56.17	55.65
10.9	8.55	15.42	10.1	46.00	54.30	10.2	17.74	50.98	10.2	21.05	17.55	10.3	55.97	55.90
11.9	8.66	15.03	11.1	45.79	54.01	11.2	17.28	50.83	11.2	20.72	17.60	11.3	55.78	56.12
12.9	8.78	14.65	12.1	45.59	53.71	12.2	16.83	50.66	12.2	20.40	17.63	12.3	55.55	56.31
13.9	8.90	14.29	13.1	45.41	53.40	13.2	16.41	50.48	13.2	20.09	17.62	13.3	55.34	56.48
14.9	9.02	13.97	14.1	45.25	53.10	14.2	16.03	50.30	14.2	19.80	17.60	14.3	55.14	56.64
15.9	9.13	13.66	15.1	45.10	52.82	15.2	15.67	50.13	15.2	19.53	17.59	15.3	54.95	56.78
16.9	9.22	13.35	16.1	44.96	52.57	16.2	15.33	49.98	16.2	19.28	17.58	16.3	54.78	56.92
17.9	9.29	13.05	17.1	44.81	52.33	17.2	14.99	49.85	17.2	19.04	17.61	17.3	54.62	57.08
18.9	9.35	12.73	18.1	44.65	52.10	18.1	14.64	49.74	18.2	18.80	17.64	18.3	54.46	57.25
19.9	9.42	12.40	19.1	44.48	51.88	19.1	14.27	49.63	19.2	18.55	17.69	19.3	54.30	57.43
20.9	9.50	12.04	20.1	44.30	51.64	20.1	13.88	49.51	20.2	18.28	17.74	20.3	54.14	57.63
21.9	9.59	11.66	21.1	44.11	51.38	21.1	13.47	49.37	21.2	17.99	17.78	21.3	53.95	57.82
22.9	9.70	11.29	22.1	43.93	51.11	22.1	13.06	49.22	22.2	17.69	17.80	22.3	53.75	58.01
23.9	9.83	10.92	23.1	43.76	50.81	23.1	12.65	49.04	23.2	17.38	17.80	23.3	53.54	58.18
24.9	9.98	10.57	24.1	43.59	50.49	24.1	12.25	48.85	24.2	17.08	17.77	24.3	53.32	58.34
25.9	10.15	10.24	25.1	43.44	50.15	25.1	11.86	48.63	25.2	16.78	17.73	25.3	53.10	58.47
26.9	10.31	9.92	26.1	43.30	49.82	26.1	11.49	48.39	26.2	16.49	17.66	26.3	52.87	58.58
27.9	10.48	9.62	27.1	43.18	49.49	27.1	11.15	48.16	27.2	16.21	17.58	27.3	52.65	58.67
28.9	10.65	9.33	28.1	43.08	49.17	28.1	10.85	47.92	28.2	15.94	17.49	28.3	52.45	58.75
29.9	10.81	9.06	29.1	42.99	48.86	29.1	10.55	47.70	29.2	15.69	17.41	29.3	52.26	58.82
30.9	10.96	8.79	30.1	42.90	48.57	30.1	10.27	47.49	30.2	15.45	17.33	30.3	52.08	58.88
31.9	11.09	8.53	31.1	42.80	48.29	31.1	10.00	47.29	31.2	15.22	17.26	31.3	51.90	58.95
32.9	11.21	8.26	32.0	42.70	48.02	32.1	9.72	47.11	32.2	15.00	17.20	32.3	51.72	59.04
11.96 -11.92			11.10 -11.05			18.48 -18.45			12.26 -12.22			9.78 -9.73		
1 ^h 42 ^m 17 ^s .46			5 ^h 47 ^m 1 ^s .50			7 ^h 17 ^m 41 ^s .19			9 ^h 9 ^m 30 ^s .42			10 ^h 59 ^m 56 ^s .70		
-85° 12' 33''.92			-84° 49' 51''.91			-86° 53' 40''.29			-85° 18' 58''.68			-84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			81 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m s	° '		h m s	° '		h m s	° '		h m s	° '		h m s	° '
June	1 42	-85 12	June	5 46	-84 49	June	7 17	-86 53	June	9 9	-85 19	June	10 59	-84 7
1.9	11.21	8.26	1.0	42.70	48.02	1.1	9.72	47.11	1.2	15.00	17.20	1.3	51.72	59.04
2.9	11.33	7.97	2.0	42.59	47.77	2.1	9.42	46.94	2.2	14.76	17.16	2.3	51.55	59.14
3.9	11.45	7.67	3.0	42.47	47.51	3.1	9.11	46.77	3.2	14.52	17.12	3.3	51.38	59.24
4.9	11.58	7.36	4.0	42.34	47.23	4.1	8.78	46.59	4 2	14.27	17.09	4.3	51.20	59.36
5.9	11.73	7.02	5.0	42.21	46.92	5.1	8.44	46.39	5.2	13.99	17.05	5.3	51.00	59.48
6.9	11.90	6.69	6.0	42.08	46.60	6.1	8.08	46.17	6.2	13.71	16.98	6.3	50.78	59.60
7.9	12.09	6.38	7.0	41.96	46.26	7.1	7.73	45.92	7.2	13.42	16.90	7.2	50.55	59.69
8.9	12.30	6.07	8.0	41.86	45.90	8.1	7.40	45.65	8.2	13.12	16.79	8.2	50.32	59.74
9.9	12.52	5.79	9.0	41.78	45.53	9.1	7.09	45.36	9.2	12.84	16.64	9.2	50.09	59.77
10.9	12.74	5.55	10.0	41.71	45.17	10.1	6.82	45.08	10.2	12.58	16.49	10.2	49.86	59.78
11.8	12.94	5.33	11.0	41.66	44.82	11.1	6.58	44.79	11.2	12.35	16.33	11.2	49.65	59.78
12.8	13.13	5.11	12.0	41.62	44.50	12.1	6.37	44.52	12.2	12.13	16.18	12.2	49.46	59.77
13.8	13.31	4.90	13.0	41.58	44.20	13.1	6.17	44.27	13.2	11.93	16.04	13.2	49.28	59.77
14.8	13.47	4.69	14.0	41.53	43.92	14.1	5.96	44.04	14.2	11.73	15.92	14.2	49.11	59.78
15.8	13.63	4.46	15.0	41.47	43.66	15.1	5.74	43.83	15.1	11.52	15.82	15.2	48.94	59.81
16.8	13.79	4.20	16.0	41.40	43.39	16.1	5.50	43.63	16.1	11.31	15.72	16.2	48.77	59.86
17.8	13.96	3.95	17.0	41.33	43.10	17.1	5.24	43.41	17.1	11.08	15.63	17.2	48.58	59.90
18.8	14.15	3.69	18.0	41.25	42.79	18.1	4.97	43.16	18.1	10.84	15.52	18.2	48.38	59.94
19.8	14.36	3.43	18.9	41.18	42.45	19.1	4.71	42.90	19.1	10.58	15.38	19.2	48.17	59.96
20.8	14.59	3.17	19.9	41.12	42.10	20.1	4.45	42.62	20.1	10.33	15.22	20.2	47.95	59.97
21.8	14.83	2.94	20.9	41.08	41.74	21.1	4.21	42.32	21.1	10.08	15.05	21.2	47.72	59.96
22.8	15.07	2.72	21.9	41.05	41.36	22.1	3.99	42.00	22.1	9.84	14.85	22.2	47.49	59.93
23.8	15.32	2.53	22.9	41.03	40.99	23.0	3.80	41.68	23.1	9.61	14.64	23.2	47.27	59.87
24.8	15.57	2.35	23.9	41.03	40.63	24.0	3.63	41.35	24.1	9.41	14.41	24.2	47.06	59.80
25.8	15.80	2.18	24.9	41.04	40.29	25.0	3.48	41.03	25.1	9.22	14.19	25.2	46.86	59.71
26.8	16.03	2.04	25.9	41.06	39.96	26.0	3.35	40.72	26.1	9.04	13.98	26.2	46.68	59.62
27.8	16.24	1.90	26.9	41.08	39.65	27.0	3.24	40.44	27.1	8.87	13.78	27.2	46.51	59.55
28.8	16.44	1.75	27.9	41.09	39.36	28.0	3.13	40.17	28.1	8.70	13.59	28.2	46.35	59.48
29.8	16.64	1.60	28.9	41.10	39.08	29.0	3.01	39.92	29.1	8.52	13.41	29.2	46.19	59.42
30.8	16.83	1.44	29.9	41.11	38.80	30.0	2.87	39.68	30.1	8.34	13.25	30.2	46.04	59.37
31.8	17.02	1.26	30.9	41.10	38.51	31.0	2.71	39.43	31.1	8.15	13.09	31.2	45.86	59.34
32.8	17.23	1.05	31.9	41.08	38.20	32.0	2.53	39.18	32.1	7.95	12.92	32.2	45.67	59.31
11.95 -11.91 1 ^h 42 ^m 17 ^s .46 -85° 12' 33''.92			11.10 -11.05 5 ^h 47 ^m 1 ^s .50 -84° 49' 51''.91			18.46 -18.44 7 ^h 17 ^m 41 ^s .19 -86° 53' 40''.29			12.26 -12.22 9 ^h 9 ^m 30 ^s .42 -85° 18' 58''.68			9.78 -9.73 10 ^h 59 ^m 56 ^s .70 -84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			5 Octantis. Mag. 5.4			7 Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
July	h m 1 42	° ' -85 11	July	h m 5 46	° ' -84 49	July	h m 7 17	° ' -86 53	July	h m 9 9	° ' -85 19	July	h m 10 59	° ' -84 7
	s s	" "		s s	" "		s s	" "		s s	" "		s s	" "
1.8	17.02	61.26	1.9	41.08	38.20	1.0	2.71	39.43	1.1	8.15	13.09	1.2	45.86	59.34
2.8	17.23	61.05	2.9	41.06	37.88	2.0	2.53	39.18	2.1	7.95	12.92	2.2	45.67	59.31
3.8	17.46	60.84	3.9	41.05	37.55	3.0	2.35	38.90	3.1	7.74	12.75	3.2	45.47	59.28
4.8	17.70	60.64	4.9	41.04	37.19	4.0	2.17	38.59	4.1	7.53	12.55	4.2	45.26	59.22
5.8	17.96	60.46	5.9	41.06	36.81	5.0	2.00	38.25	5.1	7.32	12.32	5.2	45.04	59.15
6.8	18.24	60.31	6.9	41.10	36.44	6.0	1.85	37.90	6.1	7.13	12.07	6.2	44.83	59.04
7.8	18.52	60.19	7.9	41.16	36.09	7.0	1.74	37.55	7.1	6.94	11 80	7.2	44.62	58.92
8.8	18.79	60.08	8.9	41.23	35.76	8.0	1.67	37.21	8.1	6.78	11.52	8.2	44.42	58.77
9.8	19.04	60.00	9.9	41.30	35.45	9.0	1.62	36.88	9.1	6.63	11.25	9.2	44.24	58.61
10.8	19.27	59.94	10.9	41.38	35.16	10.0	1.60	36.59	10.1	6.50	10.99	10.2	44.08	58.45
11.8	19.48	59.87	11.9	41.44	34.90	11.0	1.58	36.30	11.1	6.38	10.75	11.2	43.93	58.31
12.8	19.69	59.78	12.9	41.49	34.64	11.9	1.54	36.03	12.1	6.25	10.52	12.2	43.79	58.18
13.8	19.90	59.68	13.9	41.53	34.37	12.9	1.49	35.76	13.1	6.12	10.31	13.1	43.65	58.07
14.8	20.12	59.57	14.9	41.58	34.09	13.9	1.42	35.50	14.1	5.98	10.11	14.1	43.50	57.97
15.8	20.35	59.45	15.9	41.62	33.79	14.9	1.34	35.23	15.1	5.83	9.90	15.1	43.34	57.87
16.8	20.60	59.33	16.9	41.67	33.47	15.9	1.25	34.93	16.1	5.68	9.67	16.1	43.16	57.76
17.7	20.86	59.22	17.9	41.73	33.13	16.9	1.17	34.62	17.1	5.53	9.42	17.1	42.98	57.63
18.7	21.13	59.13	18.9	41.80	32.79	17.9	1.11	34.29	18.1	5.37	9.15	18.1	42.79	57.48
19.7	21.41	59.06	19.9	41.89	32.46	18.9	1.07	33.94	19.1	5.23	8.86	19.1	42.60	57.30
20.7	21.69	59.00	20.9	42.00	32.13	19.9	1.06	33.58	20.1	5.11	8.56	20.1	42.42	57.11
21.7	21.97	58.97	21.9	42.11	31.82	20.9	1.07	33.23	21.1	5.00	8.24	21.1	42.25	56.90
22.7	22.24	58.97	22.9	42.24	31.52	21.9	1.11	32.89	22.0	4.90	7.92	22.1	42.09	56.68
23.7	22.50	58.97	23.9	42.37	31.25	22.9	1.16	32.56	23.0	4.81	7.60	23.1	41.94	56.45
24.7	22.75	58.98	24.9	42.50	31.00	23.9	1.22	32.24	24.0	4.73	7.30	24.1	41.80	56.23
25.7	22.98	58.99	25.9	42.62	30.76	24.9	1.29	31.95	25.0	4.66	7.02	25.1	41.68	56.02
26.7	23.20	58.99	26.9	42.74	30.53	25.9	1.37	31.67	26.0	4.60	6.75	26.1	41.56	55.81
27.7	23.41	58.99	27.9	42.85	30.29	26.9	1.43	31.40	27.0	4.53	6.49	27.1	41.45	55.62
28.7	23.63	58.97	28.9	42.94	30.05	27.9	1.48	31.14	28.0	4.45	6.24	28.1	41.33	55.45
29.7	23.86	58.94	29.9	43.03	29.79	28.9	1.51	30.88	29.0	4.36	5.99	29.1	41.21	55.28
30.7	24.10	58.90	30.9	43.13	29.51	29.9	1.53	30.61	30.0	4.26	5.74	30.1	41.06	55.12
31.7	24.36	58.86	31.9	43.23	29.21	30.9	1.54	30.32	31.0	4.16	5.48	31.1	40.91	54.94
32.7	24.63	58.82	32.9	43.34	28.90	31.9	1.55	30.00	32.0	4.06	5.19	32.1	40.75	54.74
11.95 -11.91 1 ^h 42 ^m 17 ^s .46 -85° 12' 33''.92			11.09 -11.04 5 ^h 47 ^m 1 ^s .50 -84° 49' 51''.91			18.45 -18.42 7 ^h 17 ^m 41 ^s .19 -86° 53' 40''.29			12.25 -12.21 9 ^h 9 ^m 30 ^s .42 -85° 18' 58''.68			9.78 -9.73 10 ^h 59 ^m 56 ^s .70 -84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			5 Octantis. Mag. 5.4			17 Octau Mag. 1	
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.
Aug.	h m 1 42	° ' -85 11	Aug.	h m 5 46	° ' -84 49	Aug.	h m 7 17	° ' -86 53	Aug.	h m 9 9	° ' -85 18	Aug.	h m 10 59
	s s	"		s s	"		s s	"		s s	"		s s
1.7	24.63	58.82	1.9	43.34	28.90	1.9	1.58	29.66	1.0	4.06	65.19	1.1	40.75
2.7	24.91	58.81	2.9	43.48	28.59	2.9	1.65	29.30	2.0	3.97	64.87	2.1	40.58
3.7	25.20	58.83	3.9	43.64	28.30	3.9	1.75	28.95	3.0	3.90	64.54	3.1	40.43
4.7	25.48	58.88	4.9	43.80	28.03	4.9	1.89	28.62	4.0	3.85	64.19	4.1	40.29
5.7	25.74	58.95	5.9	43.98	27.78	5.9	2.05	28.32	5.0	3.81	63.85	5.1	40.17
6.7	25.98	59.03	6.9	44.16	27.56	6.9	2.22	28.04	6.0	3.79	63.52	6.1	40.06
7.7	26.20	59.12	7.9	44.32	27.37	7.9	2.38	27.79	7.0	3.78	63.22	7.1	39.98
8.7	26.41	59.21	8.9	44.49	27.19	8.9	2.53	27.54	8.0	3.77	62.94	8.1	39.90
9.7	26.61	59.28	9.9	44.63	27.01	9.9	2.67	27.30	8.9	3.76	62.67	9.1	39.82
10.7	26.81	59.33	10.9	44.76	26.82	10.9	2.78	27.05	9.9	3.75	62.41	10.1	39.74
11.7	27.03	59.37	11.9	44.89	26.61	11.9	2.89	26.79	10.9	3.73	62.15	11.1	39.65
12.7	27.26	59.41	12.8	45.03	26.37	12.9	2.99	26.52	11.9	3.70	61.88	12.1	39.55
13.7	27.50	59.46	13.8	45.19	26.13	13.9	3.10	26.22	12.9	3.66	61.59	13.1	39.44
14.7	27.76	59.53	14.8	45.36	25.88	14.9	3.24	25.90	13.9	3.62	61.29	14.1	39.32
15.7	28.02	59.61	15.8	45.54	25.64	15.9	3.41	25.59	14.9	3.60	60.97	15.1	39.21
16.7	28.29	59.71	16.8	45.74	25.41	16.9	3.60	25.28	15.9	3.59	60.63	16.1	39.10
17.7	28.55	59.83	17.8	45.95	25.19	17.9	3.81	24.99	16.9	3.59	60.28	17.1	39.00
18.7	28.80	59.97	18.8	46.16	24.99	18.9	4.05	24.70	17.9	3.62	59.93	18.1	38.91
19.7	29.04	60.13	19.8	46.38	24.81	19.9	4.31	24.43	18.9	3.66	59.59	19.0	38.84
20.7	29.27	60.30	20.8	46.60	24.65	20.9	4.57	24.19	19.9	3.70	59.26	20.0	38.78
21.7	29.48	60.47	21.8	46.81	24.52	21.9	4.83	23.96	20.9	3.76	58.94	21.0	38.74
22.7	29.67	60.64	22.8	47.01	24.40	22.9	5.08	23.75	21.9	3.82	58.63	22.0	38.69
23.6	29.86	60.80	23.8	47.20	24.28	23.9	5.31	23.55	22.9	3.88	58.35	23.0	38.66
24.6	30.04	60.94	24.8	47.38	24.16	24.9	5.52	23.36	23.9	3.94	58.09	24.0	38.63
25.6	30.22	61.06	25.8	47.56	24.03	25.9	5.72	23.15	24.9	3.99	57.84	25.0	38.59
26.6	30.41	61.18	26.8	47.72	23.88	26.9	5.91	22.92	25.9	4.02	57.58	26.0	38.54
27.6	30.61	61.29	27.8	47.89	23.71	27.9	6.10	22.68	26.9	4.05	57.31	27.0	38.48
28.6	30.83	61.41	28.8	48.08	23.52	28.9	6.30	22.42	27.9	4.08	57.02	28.0	38.42
29.6	31.06	61.55	29.8	48.29	23.34	29.9	6.52	22.15	28.9	4.11	56.72	29.0	38.35
30.6	31.30	61.71	30.8	48.51	23.17	30.9	6.78	21.88	29.9	4.15	56.41	30.0	38.28
31.6	31.53	61.90	31.8	48.74	23.01	31.9	7.07	21.63	30.9	4.21	56.08	31.0	38.22
32.6	31.75	62.11	32.8	48.98	22.89	32.9	7.39	21.40	31.9	4.29	55.74	32.0	38.18
11.95 -11.91			11.08 -11.04			18.43 -18.41			12.25 -12.21			9.78	
1 ^h 42 ^m 17 ^s .46			5 ^h 47 ^m 1 ^s .50			7 ^h 17 ^m 41 ^s .19			9 ^h 9 ^m 30 ^s .42			10 ^h 59 ^m	
-85° 12' 33''.92			-84° 49' 51''.91			-86° 53' 40''.29			-85° 18' 58''.68			-84° 7'	

4 Octantis. Mag. 5.6			81 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			5 Octantis. Mag. 5.4			7 Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Sept.	h m 1 42	° ' 85 12	Sept.	h m 5 46	° ' 84 49	Sept.	h m 7 17	° ' 86 53	Sept.	h m 9 9	° ' 85 18	Sept.	h m 10 59	° ' 84 7
	s "	"		s "	"		s "	"		s "	"		s "	"
1.6	31.75	2.11	1.8	48.98	22.89	1.9	7.39	21.40	1.9	4.40	55.42	1.0	38.18	46.33
2.6	31.95	2.34	2.8	49.22	22.80	2.9	7.71	21.19	2.9	4.52	55.12	2.0	38.16	46.00
3.6	32.12	2.58	3.8	49.46	22.74	3.9	8.04	21.01	3.9	4.64	54.84	3.0	38.16	45.68
4.6	32.27	2.81	4.8	49.69	22.69	4.8	8.36	20.86	4.9	4.75	54.59	4.0	38.16	45.37
5.6	32.40	3.04	5.8	49.90	22.65	5.8	8.67	20.72	5.9	4.86	54.36	5.0	38.18	45.08
6.6	32.54	3.24	6.8	50.09	22.60	6.8	8.95	20.57	6.9	4.98	54.13	5.9	38.21	44.81
7.6	32.68	3.44	7.8	50.29	22.54	7.8	9.21	20.42	7.9	5.08	53.90	6.9	38.22	44.53
8.6	32.84	3.62	8.8	50.48	22.46	8.8	9.47	20.25	8.9	5.19	53.65	7.9	38.23	44.27
9.6	33.00	3.81	9.8	50.68	22.37	9.8	9.74	20.07	9.9	5.28	53.39	8.9	38.22	44.00
10.6	33.18	4.00	10.8	50.90	22.28	10.8	10.02	19.87	10.9	5.37	53.11	9.9	38.21	43.71
11.6	33.37	4.21	11.8	51.13	22.18	11.8	10.32	19.67	11.9	5.47	52.81	10.9	38.19	43.41
12.6	33.56	4.43	12.8	51.37	22.09	12.8	10.64	19.47	12.9	5.59	52.51	11.9	38.18	43.10
13.6	33.75	4.68	13.8	51.63	22.01	13.8	10.99	19.28	13.9	5.73	52.21	12.9	38.17	42.77
14.6	33.93	4.95	14.8	51.89	21.96	14.8	11.36	19.09	14.9	5.88	51.91	13.9	38.18	42.42
15.6	34.09	5.23	15.8	52.15	21.93	15.8	11.75	18.93	15.9	6.05	51.62	14.9	38.19	42.08
16.6	34.24	5.54	16.8	52.40	21.93	16.8	12.14	18.79	16.9	6.23	51.36	15.9	38.22	41.74
17.6	34.37	5.84	17.7	52.66	21.94	17.8	12.53	18.68	17.9	6.41	51.11	16.9	38.27	41.41
18.6	34.48	6.14	18.7	52.91	21.97	18.8	12.92	18.58	18.9	6.61	50.88	17.9	38.34	41.09
19.6	34.58	6.43	19.7	53.14	22.01	19.8	13.29	18.50	19.9	6.80	50.67	18.9	38.41	40.78
20.6	34.67	6.70	20.7	53.36	22.05	20.8	13.63	18.43	20.9	6.98	50.48	19.9	38.49	40.49
21.6	34.75	6.95	21.7	53.56	22.08	21.8	13.96	18.36	21.9	7.15	50.29	20.9	38.56	40.22
22.6	34.84	7.18	22.7	53.76	22.09	22.8	14.28	18.28	22.9	7.30	50.10	21.9	38.62	39.97
23.6	34.94	7.41	23.7	53.97	22.09	23.8	14.58	18.17	23.9	7.45	49.90	22.9	38.67	39.72
24.6	35.06	7.65	24.7	54.18	22.09	24.8	14.89	18.06	24.9					

[Eph 13]

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			5 Octantis. Mag. 5.4			7 Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Oct.	h m 1 42	° ' -85 12	Oct.	h m 5 46	° ' -84 49	Oct.	h m 7 17	° ' -86 53	Oct.	h m 9 9	° ' -85 18	Oct.	h m 10 59	° ' -84 7
	s "	"		s "	"		s "	"		s "	"		s "	"
1.5	35.80	9.74	1.7	55.88	22.38	1.8	17.64	17.48	1.9	8.99	48.14	1.9	39.29	37.08
2.5	35.83	10.06	2.7	56.11	22.51	2.8	18.03	17.49	2.8	9.23	48.00	2.9	39.42	36.83
3.5	35.86	10.36	3.7	56.31	22.64	3.8	18.39	17.50	3.8	9.45	47.88	3.9	39.54	36.60
4.5	35.88	10.64	4.7	56.50	22.75	4.8	18.74	17.51	4.8	9.65	47.76	4.9	39.65	36.38
5.5	35.92	10.91	5.7	56.69	22.86	5.8	19.08	17.50	5.8	9.85	47.63	5.9	39.75	36.16
6.5	35.96	11.17	6.7	56.89	22.94	6.8	19.42	17.47	6.8	10.04	47.48	6.9	39.84	35.93
7.5	36.02	11.44	7.7	57.09	23.01	7.8	19.75	17.44	7.8	10.22	47.32	7.9	39.93	35.68
8.5	36.09	11.72	8.7	57.30	23.08	8.8	20.11	17.40	8.8	10.42	47.15	8.9	40.02	35.42
9.5	36.16	12.01	9.7	57.53	23.16	9.8	20.49	17.35	9.8	10.63	46.97	9.9	40.11	35.15
10.5	36.23	12.32	10.7	57.77	23.24	10.7	20.90	17.32	10.8	10.85	46.79	10.9	40.22	34.87
11.5	36.29	12.64	11.7	58.01	23.35	11.7	21.32	17.29	11.8	11.09	46.62	11.9	40.34	34.58
12.5	36.33	12.99	12.7	58.25	23.48	12.7	21.76	17.28	12.8	11.35	46.45	12.9	40.47	34.30
13.5	36.36	13.34	13.7	58.49	23.63	13.7	22.20	17.30	13.8	11.62	46.30	13.9	40.62	34.03
14.5	36.37	13.69	14.7	58.72	23.81	14.7	22.64	17.34	14.8	11.90	46.18	14.9	40.78	33.77
15.5	36.36	14.04	15.7	58.95	24.00	15.7	23.07	17.41	15.8	12.18	46.09	15.9	40.94	33.53
16.5	36.34	14.38	16.7	59.17	24.21	16.7	23.48	17.49	16.8	12.45	46.01	16.9	41.11	33.32
17.5	36.31	14.70	17.7	59.36	24.41	17.7	23.87	17.59	17.8	12.72	45.94	17.9	41.28	33.12
18.5	36.27	15.01	18.7	59.53	24.61	18.7	24.23	17.69	18.8	12.97	45.89	18.9	41.45	32.93
19.5	36.23	15.30	19.7	59.70	24.80	19.7	24.57	17.77	19.8	13.21	45.85	19.9	41.61	32.76
20.5	36.20	15.57	20.7	59.87	24.97	20.7	24.89	17.85	20.8	13.43	45.80	20.9	41.75	32.60
21.5	36.18	15.84	21.7	60.04	25.13	21.7	25.22	17.91	21.8	13.65	45.74	21.9	41.88	32.43
22.5	36.17	16.11	22.7	60.22	25.27	22.7	25.56	17.96	22.8	13.86	45.66	22.9	42.01	32.25
23.5	36.17	16.40	23.7	60.41	25.42	23.7	25.92	18.00	23.8	14.09	45.56	23.9	42.14	32.04
24.5	36.17	16.70	24.6	60.61	25.58	24.7	26.30	18.05	24.8	14.34	45.46	24.9	42.28	31.83
25.5	36.16	17.04	25.6	60.82	25.76	25.7	26.69	18.11	25.8	14.60	45.38	25.9	42.44	31.61
26.5	36.14	17.38	26.6	61.03	25.97	26.7	27.10	18.20	26.8	14.88	45.31	26.9	42.63	31.39
27.5	36.09	17.73	27.6	61.24	26.22	27.7	27.53	18.33	27.8	15.17	45.26	27.9	42.83	31.19
28.5	36.01	18.08	28.6	61.43	26.49	28.7	27.94	18.48	28.8	15.47	45.24	28.9	43.04	31.01
29.5	35.91	18.42	29.6	61.60	26.77	29.7	28.32	18.65	29.8	15.76	45.26	29.9	43.25	30.86
30.5	35.81	18.74	30.6	61.75	27.06	30.7	28.68	18.83	30.8	16.04	45.30	30.8	43.46	30.75
31.5	35.70	19.02	31.6	61.89	27.34	31.7	29.01	19.02	31.8	16.31	45.34	31.8	43.65	30.66
32.5	35.59	19.29	32.6	62.02	27.60	32.7	29.32	19.19	32.8	16.56	45.38	32.8	43.84	30.56
11.96 -11.92 1 ^h 42 ^m 17 ^s .46 -85° 12' 33''.92			11.08 -11.04 5 ^h 47 ^m 1 ^s .50 -84° 49' 51''.91			18.42 -18.39 7 ^h 17 ^m 41 ^s .19 -86° 53' 40''.29			12.24 -12.20 9 ^h 9 ^m 30 ^s .42 -85° 18' 58''.68			9.77 -9.72 10 ^h 59 ^m 56 ^s .70 -84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Nov.	h m 1 42	° ' -85 12	Nov.	h m 5 47	° ' -84 49	Nov.	h m 7 17	° ' -86 53	Nov.	h m 9 9	° ' -85 18	Nov.	h m 10 59	° ' -84 7
	s "	"		s "	"		s "	"		s "	"		s "	"
1.5	35.59	19.29	1.6	2.02	27.60	1.7	29.32	19.19	1.8	16.56	45.38	1.8	43.84	30.56
2.5	35.50	19.55	2.6	2.15	27.84	2.7	29.62	19.35	2.8	16.80	45.41	2.8	44.01	30.46
3.5	35.41	19.80	3.6	2.28	28.06	3.7	29.92	19.49	3.8	17.03	45.42	3.8	44.18	30.35
4.4	35.34	20.07	4.6	2.42	28.27	4.7	30.24	19.61	4.8	17.26	45.42	4.8	44.34	30.22
5.4	35.28	20.35	5.6	2.57	28.49	5.7	30.56	19.74	5.8	17.50	45.42	5.8	44.52	30.09
6.4	35.22	20.64	6.6	2.73	28.72	6.7	30.90	19.87	6.8	17.75	45.41	6.8	44.70	29.95
7.4	35.15	20.94	7.6	2.89	28.97	7.7	31.26	20.01	7.8	18.02	45.41	7.8	44.89	29.80
8.4	35.07	21.26	8.6	3.06	29.23	8.7	31.63	20.17	8.7	18.30	45.41	8.8	45.08	29.65
9.4	34.98	21.59	9.6	3.22	29.51	9.7	32.01	20.35	9.7	18.60	45.44	9.8	45.30	29.51
10.4	34.87	21.91	10.6	3.38	29.81	10.7	32.39	20.55	10.7	18.90	45.48	10.8	45.53	29.39
11.4	34.73	22.23	11.6	3.53	30.12	11.7	32.76	20.78	11.7	19.21	45.55	11.8	45.77	29.30
12.4	34.57	22.55	12.6	3.66	30.46	12.7	33.10	21.03	12.7	19.51	45.64	12.8	46.01	29.21
13.4	34.41	22.84	13.6	3.78	30.80	13.7	33.42	21.28	13.7	19.79	45.75	13.8	46.24	29.16
14.4	34.24	23.11	14.6	3.88	31.13	14.7	33.72	21.54	14.7	20.06	45.87	14.8	46.47	29.13
15.4	34.07	23.35	15.6	3.96	31.45	15.7	33.99	21.79	15.7	20.31	46.00	15.8	46.69	29.11
16.4	33.91	23.57	16.6	4.04	31.75	16.7	34.23	22.03	16.7	20.54	46.13	16.8	46.90	29.10
17.4	33.76	23.78	17.6	4.11	32.04	17.6	34.46	22.25	17.7	20.77	46.25	17.8	47.10	29.09
18.4	33.62	24.00	18.6	4.19	32.31	18.6	34.69	22.46	18.7	20.99	46.35	18.8	47.29	29.07
19.4	33.49	24.21	19.6	4.27	32.57	19.6	34.94	22.67	19.7	21.21	46.44	19.8	47.47	29.03
20.4	33.37	24.45	20.6	4.37	32.83	20.6	35.21	22.87	20.7	21.45	46.52	20.8	47.66	28.98
21.4	33.24	24.70	21.6	4.48	33.11	21.6	35.50	23.07	21.7	21.71	46.60	21.8	47.86	28.92
22.4	33.10	24.97	22.6	4.59	33.41	22.6	35.81	23.30	22.7	21.98	46.70	22.8	48.08	28.87
23.4	32.94	25.26	23.6	4.70	33.74	23.6	36.12	23.56	23.7	22.26	46.82	23.8	48.32	28.82
24.4	32.75	25.53	24.6	4.79	34.10	24.6	36.42	23.85	24.7	22.55	46.97	24.8	48.57	28.80
25.4	32.54	25.80	25.6	4.86	34.47	25.6	36.70	24.17	25.7	22.83	47.15	25.8	48.83	28.81
26.4	32.31	26.03	26.6	4.92	34.85	26.6	36.95	24.50	26.7	23.10	47.36	26.8	49.08	28.85
27.4	32.08	26.24	27.6	4.95	35.22	27.6	37.16	24.83	27.7	23.36	47.58	27.8	49.32	28.91
28.4	31.85	26.43	28.6	4.97	35.58	28.6	37.35	25.14	28.7	23.59	47.80	28.8	49.55	28.99
29.4	31.64	26.60	29.6	4.99	35.92	29.6	37.51	25.44	29.7	23.80	48.01	29.8	49.77	29.07
30.4	31.44	26.76	30.5	5.00	36.24	30.6	37.67	25.72	30.7	23.99	48.21	30.8	49.97	29.14
31.4	31.26	26.92	31.5	5.02	36.54	31.6	37.84	25.99	31.7	24.20	48.38	31.8	50.16	29.20
11.97 -11.93 1 ^h 42 ^m 17 ^s .46 -85° 12' 33''.92			11.09 -11.04 5 ^h 47 ^m 1 ^s .50 -84° 49' 51''.91			18.43 -18.40 7 ^h 17 ^m 41 ^s .19 -86° 53' 40''.29			12.24 -12.20 9 ^h 9 ^m 30 ^s .42 -85° 18' 58''.68			9.77 -9.72 10 ^h 59 ^m 56 ^s .70 -84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

4 Octantis. Mag. 5.6			31 Mensæ. Mag. 6.2			7 Octantis. Mag. 6.4			ζ Octantis. Mag. 5.4			η Octantis. Mag. 6.3		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Dec.	h m 1 42	° ' -85 12	Dec.	h m 5 47	° ' -84 49	Dec.	h m 7 17	° ' -86 53	Dec.	h m 9 9	° ' -85 18	Dec.	h m 10 59	° ' -84 7
	s "			s "			s "			s "			s "	
1.4	31.26	26.92	1.5	5.02	36.54	1.6	37.84	25.99	1.7	24.20	48.38	1.8	50.16	29.20
2.4	31.09	27.09	2.5	5.05	36.83	2.6	38.01	26.25	2.7	24.41	48.55	2.8	50.36	29.24
3.4	30.92	27.28	3.5	5.09	37.13	3.6	38.20	26.50	3.7	24.62	48.71	3.8	50.56	29.27
4.4	30 74	27.47	4.5	5.13	37.44	4.6	38.40	26.77	4.7	24.84	48.87	4.8	50.77	29.30
5.4	30.55	27.67	5.5	5.18	37.76	5.6	38.62	27.05	5.7	25.07	49.05	5.8	50.99	29.33
6.4	30.35	27.89	6.5	5.23	38.09	6.6	38.84	27.34	6.7	25.32	49.24	6.7	51.22	29.37
7.4	30.13	28.10	7.5	5.27	38.44	7.6	39.05	27.65	7.7	25.57	49.45	7.7	51.46	29.42
8.4	29.90	28.31	8.5	5.30	38.82	8.6	39.26	27.98	8.7	25.82	49.68	8.7	51.71	29.49
9.4	29.65	28.51	9.5	5.32	39.22	9.6	39.45	28.33	9.7	26.07	49.92	9.7	51.96	29.59
10.4	29.39	28.68	10.5	5.31	39.60	10.6	39.62	28.69	10.7	26.30	50.19	10.7	52.20	29.72
11.3	29.13	28.84	11.5	5.29	39.98	11.6	39.76	29.05	11.7	26.53	50.48	11.7	52 44	29.85
12.3	28.86	28.96	12.5	5.25	40.35	12.6	39.87	29.42	12.7	26.73	50.77	12.7	52.67	30.00
13.3	28.60	29.07	13.5	5.20	40.71	13.6	39.94	29.78	13.7	26.91	51.07	13.7	52.89	30.17
14.3	28.35	29.16	14.5	5.15	41.04	14.6	40.00	30.12	14.6	27.07	51.35	14.7	53.10	30.34
15.3	28.12	29.25	15.5	5.10	41.35	15.6	40.05	30.45	15.6	27.23	51.62	15.7	53.29	30.50
16.3	27.91	29.33	16.5	5.05	41.64	16.6	40.12	30.75	16.6	27.39	51.87	16.7	53.47	30.64
17.3	27.69	29.41	17.5	5.01	41.94	17.6	40.19	31.04	17.6	27.55	52.11	17.7	53.66	30.77
18.3	27.48	29.52	18.5	4.99	42.25	18.6	40.27	31.33	18.6	27.72	52.34	18.7	53.85	30.91
19.3	27.26	29.64	19.5	4.97	42.57	19.6	40.39	31.64	19.6	27.90	52.59	19.7	54.05	31.02
20.3	27.03	29.77	20.5	4.95	42.91	20.6	40.51	31.97	20.6	28.09	52.85	20.7	54.27	31.15
21.3	26.78	29.91	21.5	4.92	43.27	21.6	40.63	32.33	21.6	28.30	53.14	21.7	54.51	31.29
22.3	26.51	30.04	22.5	4.88	43.65	22.6	40.72	32.72	22.6	28.51	53.46	22.7	54.76	31.46
23.3	26.21	30.15	23.5	4.81	44.05	23.5	40.80	33.12	23.6	28.70	53.80	23.7	55.00	31.67
24.3	25.91	30.22	24.5	4.72	44.44	24.5	40.83	33.52	24.6	28.88	54.16	24.7	55.22	31.91
25.3	25.62	30.26	25.5	4.61	44.81	25.5	40.83	33.92	25.6	29.04	54.52	25.7	55.43	32.16
26.3	25.33	30.29	26.5	4.49	45.15	26.5	40.80	34.30	26.6	29.17	54.87	26.7	55.63	32.40
27.3	25.04	30.29	27.5	4.38	45.47	27.5	40.76	34.66	27.6	29.29	55.22	27.7	55.81	32.64
28.3	24.80	30.30	28.5	4.27	45.77	28.5	40.72	35.00	28.6	29.39	55.54	28.7	55.98	32.88
29.3	24.55	30.31	29.5	4.17	46.05	29.5	40.68	35.32	29.6	29.49	55.84	29.7	56.15	33.10
30.3	24.31	30.31	30.5	4.07	46.33	30.5	40.66	35.64	30.6	29.60	56.13	30.7	56.32	33.30
31.3	24.07	30.34	31.5	3.99	46.63	31.5	40.65	35.95	31.6	29.72	56.41	31.7	56.49	33.50
32.3	23.83	30.38	32.5	3.91	46.93	32.5	40.66	36.28	32.6	29.85	56.70	32.7	56 67	33.71
11.97 -11.93			11.09 -11.05			18.44 -18.42			12.24 -12.20			9.77 -9.72		
1 ^h 42 ^m 17 ^s .46			5 ^h 47 ^m 1 ^s .50			7 ^h 17 ^m 41 ^s .19			9 ^h 9 ^m 30 ^s .42			10 ^h 59 ^m 56 ^s .70		
-85° 12' 33''.92			-84° 49' 51''.91			-86° 53' 40''.29			-85° 18' 58''.68			-84° 7' 33''.14		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ζ Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Jan.	12 45	-84 38	Jan.	14 12	-83 15	Jan.	18 3	-87 39	Jan.	19 19	-89 13	Jan.	22 15	-86 24
	s	"		s	"		s	"		s	"		s	"
0.8	36.67	44.65	0.8	41.77	59.63	0.9	14.88	58.55	1.0	50.15	69.43	1.1	14.09	60.42
1.7	36.96	44.71	1.8	41.99	59.53	1.9	15.10	58.19	2.0	50.20	69.03	2.1	13.81	60.14
2.7	37.26	44.81	2.8	42.24	59.47	2.9	15.37	57.83	3.0	50.38	68.63	3.1	13.55	59.84
3.7	37.55	44.94	3.8	42.49	59.45	3.9	15.68	57.48	4.0	50.67	68.23	4.1	13.32	59.53
4.7	37.82	45.08	4.8	42.73	59.46	4.9	16.01	57.15	5.0	51.07	67.85	5.1	13.11	59.21
5.7	38.08	45.23	5.8	42.95	59.48	5.9	16.35	56.84	6.0	51.55	67.50	6.1	12.93	58.90
6.7	38.34	45.39	6.8	43.16	59.52	6.9	16.69	56.56	7.0	52.05	67 16	7.1	12.76	58.59
7.7	38.57	45.55	7.8	43.37	59.55	7.9	17.02	56.30	8.0	52.54	66.83	8.1	12.61	58.29
8.7	38.80	45.70	8.8	43.57	59.58	8.9	17.35	56.04	9.0	53.02	66.52	9.1	12.47	58.02
9.7	39.01	45.85	9.8	43.76	59.61	9.9	17.67	55.78	10.0	53.45	66.22	10.1	12.32	57.75
10.7	39.23	45.98	10.8	43.95	59.64	10.9	17.97	55.52	10.9	53.84	65.91	11.1	12.16	57.49
11.7	39.46	46.10	11.8	44.14	59.65	11.9	18.26	55.25	11.9	54.19	65.60	12.1	12.00	57.22
12.7	39.70	46.22	12.8	44.34	59.66	12.9	18.54	54.97	12.9	54.51	65.28	13.1	11.81	56.95
13.7	39.94	46.34	13.8	44.54	59.66	13.9	18.82	54.67	13.9	54.82	64.94	14.1	11.61	56.66
14.7	40.19	46.47	14.8	44.76	59.66	14.9	19.14	54.36	14.9	55.18	64.58	15.1	11.40	56.36
15.7	40.45	46.63	15.8	44.99	59.67	15.9	19.48	54.04	15.9	55.61	64.19	16.1	11.20	56.04
16.7	40.73	46.79	16.8	45.24	59.69	16.9	19.87	53.71	16.9	56.16	63.81	17.1	11.01	55.68
17.7	41.01	46.99	17.8	45.49	59.74	17.9	20.30	53.39	17.9	56.85	63.42	18.1	10.84	55.31
18.7	41.27	47.22	18.8	45.73	59.83	18.9	20.77	53.09	18.9	57.70	63.04	19.1	10.69	54.93
19.7	41.53	47.47	19.8	45.96	59.93	19.9	21.26	52.82	19.9	58.65	62.67	20.1	10.58	54.54
20.7	41.76	47.73	20.8	46.19	60.06	20.9	21.77	52.56	20.9	59.67	62.33	21.1	10.52	54.17
21.7	41.97	47.99	21.8	46.41	60.21	21.9	22.26	52.34	21.9	60.68	62.03	22.1	10.46	53.82
22.7	42.17	48.24	22.8	46.61	60.35	22.9	22.74	52.13	22.9	61.66	61.74	23.1	10.40	53.48
23.7	42.36	48.47	23.8	46.80	60.48	23.9	23.18	51.92	23.9	62.57	61.46	24.1	10.34	53.16
24.7	42.55	48.69	24.7	46.99	60.58	24.9	23.58	51.72	24.9	63.38	61.18	25.1	10.26	52.85
25.7	42.76	48.88	25.7	47.19	60.68	25.9	23.98	51.49	25.9	64.12	60.87	26.1	10.15	52.55
26.7	42.97	49.08	26.7	47.39	60.74	26.9	24.38	51.24	26.9	64.81	60.55	27.1	10.02	52.22
27.7	43.20	49.28	27.7	47.61	60.81	27.9	24.79	50.97	27.9	65.52	60.22	28.1	9.88	51.88
28.7	43.46	49.51	28.7	47.83	60.90	28.9	25.24	50.68	28.9	66.33	59.86	29.1	9.75	51.51
29.7	43.71	49.75	29.7	48.07	61.01	29.9	25.73	50.39	29.9	67.26	59.49	30.1	9.62	51.12
30.7	43.97	50.01	30.7	48.31	61.14	30.9	26.25	50.11	30.9	68.32	59.12	31.1	9.53	50.71
31.7	44.20	50 29	31.7	48.54	61.28	31.9	26.81	49.85	31.9	69.47	58.77	32.1	9.47	50.30
32.7	44.42	50 59	32.7	48.77	61.45	32.9	27.37	49.63	32.9	70.70	58.43	33.1	9.42	49.90
10.72 -10.67			8.53 -8.47			24.54 -24.52			74.85 -74.84			16.00 -15.96		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3''.86			-83° 16' 13''.94			-87° 39' 53''.07			-89° 13' 57''.47			-86° 24' 39''.46		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ζ Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Feb.	12 45	-84 38	Feb.	14 12	-83 16	Feb.	18 3	-87 39	Feb.	19 20	-89 13	Feb.	22 15	-86 24
	s	"		s	"		s	"		s	"		s	"
1.7	44.42	50.59	1.7	48.77	1.45	1.9	27.37	49.63	1.9	10.70	58.43	1.1	9.47	50.30
2.7	44.63	50.90	2.7	48.99	1.64	2.9	27.94	49.42	2.9	11.97	58.12	2.1	9.42	49.90
3.7	44.83	51.21	3.7	49.20	1.83	3.9	28.50	49.23	3.9	13.25	57.83	3.1	9.40	49.50°
4.7	45.01	51.50	4.7	49.39	2.02	4.9	29.04	49.05	4.9	14.50	57.55	4.1	9.38	49.13
5.7	45.17	51.79	5.7	49.58	2.21	5.9	29.57	48.90	5.9	15.71	57.30	5.1	9.38	48.76
6.7	45.34	52.07	6.7	49.77	2.39	6.9	30.08	48.74	6.9	16.86	57.05	6.0	9.39	48.42
7.6	45.51	52.34	7.7	49.96	2.57	7.9	30.56	48.57	7.9	17.97	56.78	7.0	9.38	48.08
8.6	45.69	52.59	8.7	50.14	2.72	8.9	31.04	48.38	8.9	19.04	56.51	8.0	9.36	47.74
9.6	45.87	52.85	9.7	50.32	2.87	9.9	31.53	48.19	9.9	20.10	56.23	9.0	9.34	47.40
10.6	46.07	53.11	10.7	50.52	3.03	10.9	32.02	47.98	10.9	21.16	55.94	10.0	9.30	47.06
11.6	46.27	53.38	11.7	50.72	3.18	11.9	32.54	47.77	11.9	22.28	55.62	11.0	9.24	46.71
12.6	46.48	53.66	12.7	50.94	3.34	12.9	33.10	47.54	12.9	23.49	55.29	12.0	9.19	46.33
13.6	46.69	53.97	13.7	51.16	3.53	13.9	33.69	47.32	13.9	24.82	54.96	13.0	9.15	45.93
14.6	46.90	54.31	14.7	51.39	3.74	14.8	34.32	47.12	14.9	26.29	54.64	14.0	9.12	45.50
15.6	47.10	54.66	15.7	51.61	3.99	15.8	34.99	46.93	15.9	27.88	54.34	15.0	9.13	45.07
16.6	47.27	55.04	16.7	51.82	4.26	16.8	35.67	46.78	16.9	29.54	54.06	16.0	9.15	44.64
17.6	47.43	55.42	17.7	52.01	4.53	17.8	36.33	46.66	17.9	31.24	53.81	17.0	9.22	44.22
18.6	47.57	55.80	18.7	52.19	4.81	18.8	36.97	46.56	18.9	32.90	53.57	18.0	9.31	43.82
19.6	47.69	56.15	19.7	52.36	5.08	19.8	37.58	46.46	19.9	34.48	53.36	19.0	9.41	43.43
20.6	47.82	56.49	20.7	52.52	5.33	20.8	38.17	46.37	20.9	35.95	53.16	20.0	9.51	43.06
21.6	47.94	56.81	21.7	52.69	5.56	21.8	38.72	46.28	21.9	37.33	52.95	21.0	9.58	42.71
22.6	48.08	57.11	22.7	52.86	5.77	22.8	39.27	46.15	22.9	38.68	52.71	22.0	9.65	42.37
23.6	48.23	57.42	23.7	53.04	5.98	23.8	39.82	45.99	23.9	40.01	52.45	23.0	9.68	42.02
24.6	48.40	57.73	24.7	53.22	6.19	24.8	40.40	45.82	24.9	41.40	52.18	23.9	9.71	41.66
25.6	48.58	58.06	25.7	53.42	6.42	25.8	41.02	45.65	25.9	42.88	51.90	24.9	9.73	41.27
26.6	48.75	58.41	26.7	53.63	6.68	26.8	41.67	45.50	26.9	44.46	51.62	25.9	9.76	40.86
27.6	48.92	58.79	27.7	53.84	6.95	27.8	42.35	45.35	27.9	46.15	51.34	26.9	9.80	40.43
28.6	49.07	59.18	28.7	54.03	7.24	28.8	43.04	45.22	28.9	47.94	51.09	27.9	9.87	40.00
29.6	49.21	59.58	29.6	54.21	7.54	29.8	43.73	45.12	29.9	49.77	50.87	28.9	9.97	39.58
30.6	49.32	59.97	30.6	54.38	7.85	30.8	44.41	45.06	30.9	51.59	50.67	29.9	10.10	39.18
10.72	-10.68		8.53	-8.47		24.52	-24.50		74.58	-74.58		15.98	-15.95	
12 ^h 45 ^m	43° 33'		14 ^h 12 ^m	50° 81'		18 ^h 3 ^m	48° 95'		19 ^h 21 ^m	19° 15'		22 ^h 15 ^m	19° 18'	
-84° 39'	3'' .86		-83° 16'	13'' .94		-87° 39'	53'' .07		-89° 13'	57'' .47		-86° 24'	39'' .46	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ε Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Mar.	12 45	-84 38	Mar.	14 12	-83 16	Mar.	18 3	-87 39	Mar.	19 20	-89 13	Mar.	22 15	-86 24
	s	"		s	"		s	"		s	"		s	"
1.6	49.21	59.58	1.6	54.21	7.54	1.8	43.73	45.12	1.9	49.77	50.87	1.9	10.10	39.18
2.6	49.32	59.97	2.6	54.38	7.85	2.8	44.41	45.06	2.9	51.59	50.67	2.9	10.24	38.79
3.6	49.42	60.36	3.6	54.54	8.17	3.8	45.09	45.00	3.9	53.39	50.49	3.9	10.39	38.41
4.6	49.51	60.74	4.6	54.70	8.47	4.8	45.73	44.96	4.9	55.14	50.32	4.9	10.54	38.05
5.6	49.60	61.11	5.6	54.84	8.77	5.8	46.34	44.93	5.9	56.83	50.16	5.9	10.69	37.70
6.6	49.68	61.46	6.6	54.97	9.07	6.8	46.94	44.89	6.8	58.46	49.99	6.9	10.83	37.36
7.6	49.77	61.80	7.6	55.10	9.34	7.8	47.51	44.84	7.8	60.03	49.83	7.9	10.96	37.03
8.6	49.86	62.13	8.6	55.25	9.60	8.8	48.09	44.78	8.8	61.56	49.67	8.9	11.07	36.69
9.6	49.96	62.46	9.6	55.40	9.86	9.8	48.67	44.71	9.8	63.09	49.47	9.9	11.17	36.33
10.6	50.08	62.80	10.6	55.55	10.12	10.8	49.27	44.62	10.8	64.64	49.26	10.9	11.28	35.97
11.6	50.20	63.16	11.6	55.72	10.38	11.8	49.88	44.53	11.8	66.27	49.05	11.9	11.38	35.60
12.6	50.32	63.52	12.6	55.89	10.66	12.8	50.54	44.44	12.8	67.98	48.83	12.9	11.48	35.21
13.6	50.45	63.92	13.6	56.06	10.96	13.8	51.24	44.35	13.8	69.81	48.61	13.9	11.62	34.80
14.6	50.56	64.32	14.6	56.24	11.29	14.8	51.96	44.28	14.8	71.75	48.40	14.9	11.79	34.38
15.6	50.66	64.75	15.6	56.40	11.64	15.8	52.69	44.25	15.8	73.78	48.23	15.9	11.99	33.97
16.5	50.73	65.18	16.6	56.54	12.01	16.8	53.42	44.25	16.8	75.85	48.07	16.9	12.21	33.58
17.5	50.78	65.61	17.6	56.68	12.38	17.8	54.13	44.27	17.8	77.92	47.95	17.9	12.44	33.21
18.5	50.82	66.03	18.6	56.80	12.76	18.8	54.81	44.30	18.8	79.91	47.85	18.9	12.68	32.86
19.5	50.85	66.43	19.6	56.90	13.11	19.8	55.45	44.34	19.8	81.80	47.76	19.9	12.92	32.53
20.5	50.89	66.80	20.6	57.01	13.44	20.8	56.06	44.37	20.8	83.58	47.67	20.9	13.13	32.21
21.5	50.93	67.16	21.6	57.12	13.75	21.8	56.65	44.38	21.8	85.27	47.56	21.9	13.31	31.90
22.5	50.98	67.50	22.6	57.23	14.04	22.8	57.23	44.38	22.8	86.93	47.43	22.9	13.49	31.58
23.5	51.05	67.85	23.6	57.35	14.34	23.7	57.85	44.35	23.8	88.61	47.28	23.9	13.65	31.24
24.5	51.13	68.22	24.6	57.49	14.64	24.7	58.49	44.31	24.8	90.36	47.12	24.9	13.80	30.87
25.5	51.21	68.60	25.6	57.64	14.96	25.7	59.16	44.28	25.8	92.21	46.95	25.9	13.98	30.49
26.5	51.30	69.01	26.6	57.78	15.30	26.7	59.85	44.25	26.8	94.16	46.79	26.9	14.17	30.10
27.5	51.36	69.43	27.6	57.92	15.65	27.7	60.56	44.27	27.8	96.20	46.65	27.9	14.40	29.72
28.5	51.41	69.85	28.6	58.04	16.02	28.7	61.27	44.29	28.8	98.28	46.55	28.9	14.65	29.35
29.5	51.44	70.28	29.6	58.16	16.41	29.7	61.98	44.34	29.8	100.37	46.44	29.9	14.91	28.99
30.5	51.45	70.70	30.6	58.26	16.79	30.7	62.67	44.42	30.8	102.44	46.38	30.9	15.19	28.67
31.5	51.45	71.11	31.6	58.34	17.17	31.7	63.32	44.50	31.8	104.44	46.33	31.9	15.47	28.36
32.5	51.44	71.50	32.6	58.42	17.54	32.7	63.95	44.59	32.8	106.37	46.29	32.9	15.75	28.06
10.73 -10.68			8.53 -8.47			24.52 -24.50			74.42 -74.41			15.97 -15.94		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3''.86			-83° 16' 13''.94			-87° 39' 53''.07			-89° 13' 57''.47			-86° 24' 39''.46		

APPARENT PLACES OF C
FOR THE UPPER TRANSIT AT

STARS

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ζ Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
May	h m 12 45	° ' -84 39	May	h m 14 12	° ' -83 16	May	h m 18 4	° ' -87 39	May	h m 19 22	° ' -89 13	May	h m 22 15	° ' -86 24
	s "	"		s "	"		s "	"		s "	"		s "	"
1.4	50.48	22.56	1.5	60.14	28.35	1.6	21.74	48.23	1.7	42.98	46.19	1.8	24.72	20.12
2.4	50.39	22.85	2.5	60.14	28.67	2.6	22.20	48.42	2.7	44.60	46.27	2.8	25.03	19.95
3.4	50.31	23.14	3.5	60.15	28.99	3.6	22.67	48.59	3.7	46.18	46.34	3.8	25.34	19.78
4.4	50.24	23.44	4.5	60.17	29.31	4.6	23.15	48.75	4.7	47.78	46.39	4.8	25.64	19.59
5.4	50.18	23.75	5.5	60.20	29.62	5.6	23.63	48.89	5.7	49.43	46.43	5.8	25.94	19.39
6.4	50.12	24.07	6.5	60.22	29.95	6.6	24.15	49.05	6.7	51.17	46.47	6.8	26.25	19.17
7.4	50.05	24.41	7.5	60.25	30.30	7.6	24.70	49.21	7.7	52.99	46.52	7.8	26.58	18.95
8.4	49.97	24.76	8.5	60.27	30.67	8.6	25.27	49.40	8.7	54.91	46.59	8.8	26.93	18.73
9.4	49.88	25.13	9.5	60.28	31.06	9.6	25.84	49.60	9.7	56.88	46.68	9.8	27.32	18.51
10.4	49.76	25.50	10.5	60.27	31.46	10.6	26.39	49.84	10.7	58.86	46.78	10.8	27.74	18.33
11.4	49.63	25.85	11.5	60.25	31.86	11.6	26.91	50.10	11.7	60.78	46.94	11.8	28.16	18.17
12.4	49.48	26.18	12.5	60.22	32.24	12.6	27.39	50.38	12.7	62.59	47.11	12.8	28.56	18.04
13.4	49.33	26.47	13.4	60.17	32.60	13.6	27.84	50.65	13.7	64.28	47.28	13.8	28.96	17.93
14.4	49.18	26.74	14.4	60.13	32.92	14.6	28.23	50.91	14.7	65.85	47.44	14.8	29.33	17.82
15.4	49.05	27.00	15.4	60.09	33.23	15.6	28.61	51.15	15.7	67.32	47.58	15.8	29.67	17.73
16.4	48.94	27.25	16.4	60.06	33.52	16.6	28.98	51.37	16.7	68.75	47.72	16.8	29.99	17.62
17.4	48.84	27.51	17.4	60.04	33.81	17.6	29.38	51.57	17.7	70.20	47.83	17.8	30.30	17.49
18.4	48.74	27.78	18.4	60.03	34.10	18.6	29.79	51.76	18.7	71.70	47.92	18.8	30.61	17.34
19.4	48.65	28.06	19.4	60.03	34.41	19.6	30.25	51.95	19.6	73.29	48.02	19.8	30.94	17.19
20.4	48.55	28.36	20.4	60.03	34.75	20.6	30.72	52.15	20.6	74.96	48.12	20.8	31.30	17.04
21.4	48.43	28.67	21.4	60.01	35.09	21.6	31.20	52.38	21.6	76.69	48.23	21.8	31.67	16.88
22.4	48.30	28.98	22.4	59.98	35.45	22.6	31.66	52.63	22.6	78.46	48.38	22.8	32.07	16.74
23.4	48.15	29.28	23.4	59.94	35.81	23.6	32.11	52.90	23.6	80.20	48.55	23.8	32.47	16.63
24.4	47.98	29.57	24.4	59.89	36.16	24.6	32.54	53.19	24.6	81.87	48.74	24.8	32.89	16.54
25.4	47.81	29.84	25.4	59.82	36.50	25.6	32.92	53.49	25.6	83.45	48.94	25.8	33.30	16.47
26.4	47.63	30.09	26.4	59.75	36.83	26.6	33.27	53.79	26.6	84.94	49.16	26.7	33.70	16.42
27.4	47.45	30.32	27.4	59.67	37.14	27.6	33.60	54.09	27.6	86.33	49.38	27.7	34.08	16.39
28.3	47.28	30.55	28.4	59.59	37.43	28.6	33.89	54.38	28.6	87.63	49.59	28.7	34.46	16.36
29.3	47.12	30.75	29.4	59.52	37.69	29.6	34.17	54.65	29.6	88.87	49.80	29.7	34.81	16.33
30.3	46.97	30.94	30.4	59.45	37.95	30.6	34.44	54.91	30.6	90.07	50.00	30.7	35.14	16.30
31.3	46.82	31.13	31.4	59.39	38.21	31.6	34.73	55.16	31.6	91.27	50.18	31.7	35.47	16.25
32.3	46.68	31.32	32.4	59.34	38.46	32.6	35.02	55.39	32.6	92.50	50.35	32.7	35.79	16.20
10.74 -10.69			8.54 -8.48			24.54 -24.52			74.40 -74.39			15.95 -15.92		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3''.86			-83° 16' 13''.94			-87° 39' 53''.07			-89° 13' 57''.47			-86° 24' 39''.46		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
June	12 45	-84 39	June	14 12	-83 16	June	18 4	-87 39	June	19 23	-89 13	June	22 15	-86 24
	s	"		s	"		s	"		s	"		s	"
1.3	46.68	31.32	1.4	59.34	38.46	1.6	35.02	55.39	1.6	32.50	50.35	1.7	35.79	16.20
2.3	46.55	31.53	2.4	59.29	38.73	2.6	35.33	55.63	2.6	33.80	50.51	2.7	36.12	16.12
3.3	46.42	31.76	3.4	59.24	39.01	3.6	35.67	55.87	3.6	35.16	50.66	3.7	36.46	16.04
4.3	46.28	32.00	4.4	59.20	39.31	4.6	36.03	56.12	4.6	36.60	50.83	4.7	36.82	15.96
5.3	46.12	32.26	5.4	59.14	39.63	5.5	36.40	56.39	5.6	38.11	51.02	5.7	37.20	15.89
6.3	45.95	32.51	6.4	59.06	39.96	6.5	36.76	56.68	6.6	39.65	51.23	6.7	37.62	15.84
7.3	45.76	32.75	7.4	58.98	40.29	7.5	37.09	57.01	7.6	41.13	51.48	7.7	38.04	15.81
8.3	45.55	32.98	8.4	58.88	40.60	8.5	37.39	57.35	8.6	42.52	51.74	8.7	38.46	15.81
9.3	45.33	33.17	9.4	58.77	40.90	9.5	37.64	57.70	9.6	43.78	52.02	9.7	38.87	15.83
10.3	45.11	33.35	10.4	58.65	41.16	10.5	37.84	58.03	10.6	44.90	52.30	10.7	39.24	15.88
11.3	44.91	33.49	11.4	58.54	41.39	11.5	38.01	58.34	11.6	45.89	52.56	11.7	39.60	15.94
12.3	44.73	33.62	12.4	58.44	41.61	12.5	38.17	58.63	12.6	46.81	52.81	12.7	39.92	15.98
13.3	44.56	33.75	13.4	58.35	41.81	13.5	38.33	58.90	13.6	47.72	53.03	13.7	40.24	16.00
14.3	44.40	33.87	14.4	58.27	42.02	14.5	38.52	59.15	14.6	48.66	53.24	14.7	40.54	16.01
15.3	44.24	34.02	15.4	58.20	42.24	15.5	38.74	59.40	15.6	49.67	53.43	15.7	40.85	16.01
16.3	44.09	34.19	16.4	58.13	42.47	16.5	38.98	59.66	16.6	50.77	53.63	16.7	41.18	16.00
17.3	43.93	34.36	17.4	58.05	42.73	17.5	39.23	59.94	17.6	51.94	53.84	17.7	41.53	15.99
18.3	43.75	34.54	18.4	57.95	42.99	18.5	39.47	60.23	18.6	53.13	54.07	18.7	41.89	15.99
19.3	43.56	34.72	19.3	57.85	43.26	19.5	39.68	60.55	19.6	54.30	54.33	19.7	42.28	16.03
20.3	43.35	34.89	20.3	57.73	43.52	20.5	39.89	60.88	20.6	55.42	54.61	20.7	42.68	16.07
21.3	43.14	35.04	21.3	57.61	43.78	21.5	40.06	61.23	21.6	56.47	54.91	21.7	43.06	16.14
22.3	42.91	35.16	22.3	57.47	44.02	22.5	40.18	61.57	22.6	57.42	55.21	22.7	43.44	16.23
23.3	42.67	35.26	23.3	57.33	44.23	23.5	40.28	61.92	23.6	58.25	55.52	23.7	43.79	16.34
24.3	42.45	35.35	24.3	57.19	44.42	24.5	40.35	62.25	24.6	58.97	55.83	24.7	44.14	16.46
25.3	42.24	35.42	25.3	57.05	44.60	25.5	40.40	62.57	25.5	59.62	56.12	25.7	44.47	16.58
26.3	42.03	35.48	26.3	56.92	44.75	26.5	40.44	62.86	26.5	60.21	56.40	26.7	44.76	16.71
27.3	41.84	35.53	27.3	56.80	44.90	27.5	40.47	63.15	27.5	60.77	56.66	27.7	45.05	16.81
28.3	41.66	35.58	28.3	56.68	45.05	28.5	40.51	63.41	28.5	61.34	56.91	28.7	45.33	16.91
29.3	41.48	35.64	29.3	56.57	45.20	29.5	40.56	63.67	29.5	61.95	57.16	29.7	45.62	16.99
30.3	41.30	35.72	30.3	56.46	45.36	30.5	40.66	63.93	30.5	62.63	57.39	30.7	45.90	17.05
31.3	41.14	35.81	31.3	56.36	45.54	31.5	40.77	64.20	31.5	63.39	57.62	31.7	46.21	17.12
10.74 -10.70			8.54 -8.48			24.56 -24.54			74.56 -74.55			15.95 -15.91		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3''.86			-83° 16' 13''.94			-87° 39' 53''.07			-89° 13' 57''.47			-86° 24' 39''.46		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ζ Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
July	h m 12 45	° ' -84 39	July	h m 14 12	° ' -83 16	July	h m 18 4	° ' -87 40	July	h m 19 24	° ' -89 13	July	h m 22 15	° ' -86 24
	s "	"		s "	"		s "	"		s "	"		s "	"
1.3	41.14	35.81	1.3	56.36	45.54	1.5	40.77	4.20	1.5	3.39	57.62	1.7	46.21	17.12
2.3	40.95	35.92	2.3	56.25	45.73	2.5	40.89	4.50	2.5	4.21	57.88	2.6	46.54	17.20
3.3	40.75	36.03	3.3	56.12	45.94	3.5	41.01	4.81	3.5	5.07	58.16	3.6	46.89	17.28
4.2	40.53	36.14	4.3	55.98	46.15	4.5	41.10	5.15	4.5	5.91	58.46	4.6	47.25	17.39
5.2	40.29	36.24	5.3	55.82	46.36	5.5	41.17	5.51	5.5	6.69	58.79	5.6	47.62	17.51
6.2	40.04	36.29	6.3	55.66	46.55	6.5	41.18	5.86	6.5	7.32	59.13	6.6	47.97	17.68
7.2	39.80	36.33	7.3	55.49	46.70	7.5	41.15	6.21	7.5	7.81	59.47	7.6	48.31	17.85
8.2	39.57	36.32	8.3	55.33	46.83	8.5	41.07	6.54	8.5	8.15	59.79	8.6	48.61	18.04
9.2	39.35	36.31	9.3	55.17	46.92	9.5	40.98	6.85	9.5	8.37	60.11	9.6	48.88	18.23
10.2	39.14	36.29	10.3	55.03	47.01	10.5	40.90	7.13	10.5	8.56	60.39	10.6	49.13	18.41
11.2	38.96	36.26	11.3	54.89	47.08	11.4	40.82	7.39	11.5	8.76	60.66	11.6	49.37	18.58
12.2	38.79	36.25	12.3	54.77	47.16	12.4	40.76	7.64	12.5	9.03	60.91	12.6	49.59	18.72
13.2	38.62	36.25	13.3	54.65	47.26	13.4	40.73	7.89	13.5	9.35	61.16	13.6	49.84	18.85
14.2	38.44	36.28	14.3	54.52	47.38	14.4	40.71	8.15	14.5	9.75	61.42	14.6	50.09	18.98
15.2	38.25	36.31	15.3	54.39	47.50	15.4	40.70	8.44	15.5	10.20	61.69	15.6	50.37	19.11
16.2	38.05	36.33	16.3	54.25	47.63	16.4	40.68	8.75	16.5	10.65	61.99	16.6	50.66	19.25
17.2	37.84	36.34	17.3	54.10	47.76	17.4	40.65	9.06	17.5	11.06	62.30	17.6	50.96	19.43
18.2	37.60	36.35	18.3	53.93	47.89	18.4	40.57	9.39	18.5	11.37	62.63	18.6	51.26	19.62
19.2	37.36	36.33	19.3	53.76	48.00	19.4	40.45	9.73	19.5	11.59	62.97	19.6	51.55	19.83
20.2	37.12	36.28	20.3	53.58	48.07	20.4	40.30	10.06	20.5	11.70	63.32	20.6	51.83	20.07
21.2	36.89	36.22	21.3	53.40	48.13	21.4	40.13	10.38	21.5	11.71	63.66	21.6	52.08	20.31
22.2	36.67	36.13	22.3	53.22	48.18	22.4	39.92	10.67	22.5	11.62	63.99	22.6	52.32	20.56
23.2	36.45	36.04	23.3	53.05	48.20	23.4	39.71	10.95	23.5	11.46	64.31	23.6	52.52	20.81
24.2	36.26	35.94	24.3	52.89	48.21	24.4	39.48	11.21	24.5	11.25	64.61	24.6	52.72	21.05
25.2	36.07	35.84	25.3	52.73	48.21	25.4	39.25	11.46	25.5	11.04	64.88	25.6	52.90	21.28
26.2	35.90	35.74	26.2	52.58	48.22	26.4	39.05	11.69	26.5	10.85	65.14	26.6	53.07	21.49
27.2	35.73	35.66	27.2	52.44	48.23	27.4	38.88	11.92	27.5	10.73	65.40	27.6	53.25	21.69
28.2	35.56	35.59	28.2	52.31	48.26	28.4	38.73	12.15	28.5	10.68	65.65	28.6	53.44	21.88
29.2	35.40	35.54	29.2	52.17	48.29	29.4	38.58	12.40	29.5	10.69	65.92	29.6	53.64	22.06
30.2	35.20	35.50	30.2	52.03	48.35	30.4	38.45	12.67	30.5	10.75	66.20	30.6	53.86	22.26
31.2	35.00	35.45	31.2	51.88	48.41	31.4	38.31	12.95	31.4	10.82	66.51	31.6	54.10	22.47
32.2	34.78	35.39	32.2	51.70	48.47	32.4	38.14	13.25	32.4	10.83	66.83	32.6	54.34	22.70
10.75 -10.70			8.54 -8.49			24.59 -24.57			74.78 -74.77			15.95 -15.92		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3''.86			-83° 16' 13''.94			-87° 39' 53''.07			-89° 13' 57''.47			-86° 24' 39''.46		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT 21

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON.

ζ Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m ° '			h m ° '			h m ° '			h m ° '			h m ° '	
Sept.	12 45	-84 39	Sept.	14 12	-83 16	Sept.	18 4	-87 40	Sept.	19 23	-89 14	Sept.	22 15	-86 24
	s "			s "			s "			s "			s "	
1.1	29.64	29.76	1.1	46.83	45.96	1.3	27.35	19.58	1.4	50.39	15.11	1.5	57.39	31.45
2.1	29.52	29.49	2.1	46.68	45.77	2.3	26.85	19.70	2.4	49.12	15.33	2.5	57.36	31.79
3.1	29.42	29.18	3.1	46.54	45.55	3.3	26.34	19.79	3.4	47.82	15.52	3.5	57.30	32.10
4.1	29.34	28.89	4.1	46.42	45.33	4.3	25.86	19.87	4.4	46.56	15.68	4.5	57.23	32.38
5.1	29.27	28.63	5.1	46.32	45.13	5.3	25.42	19.92	5.4	45.36	15.83	5.5	57.15	32.65
6.1	29.19	28.38	6.1	46.22	44.93	6.3	25.00	19.98	6.3	44.23	15.97	6.5	57.09	32.90
7.1	29.11	28.15	7.1	46.12	44.75	7.3	24.60	20.04	7.3	43.18	16.12	7.5	57.05	33.15
8.1	29.03	27.92	8.1	46.01	44.58	8.3	24.20	20.13	8.3	42.20	16.28	8.5	57.02	33.40
9.1	28.94	27.69	9.1	45.89	44.42	9.3	23.79	20.23	9.3	41.20	16.46	9.5	57.01	33.68
10.1	28.84	27.45	10.1	45.76	44.26	10.3	23.36	20.34	10.3	40.16	16.66	10.5	56.99	33.96
11.1	28.72	27.20	11.1	45.63	44.08	11.3	22.92	20.46	11.3	39.03	16.86	11.5	56.97	34.27
12.1	28.61	26.92	12.1	45.49	43.90	12.3	22.45	20.57	12.3	37.80	17.08	12.5	56.94	34.59
13.1	28.50	26.63	13.1	45.35	43.68	13.3	21.92	20.68	13.3	36.46	17.28	13.4	56.88	34.92
14.1	28.40	26.33	14.1	45.22	43.45	14.3	21.38	20.77	14.3	35.05	17.48	14.4	56.81	35.25
15.0	28.31	26.01	15.1	45.09	43.21	15.3	20.83	20.83	15.3	33.57	17.66	15.4	56.70	35.59
16.0	28.25	25.68	16.1	44.96	42.94	16.3	20.27	20.87	16.3	32.02	17.82	16.4	56.59	35.91
17.0	28.19	25.34	17.1	44.86	42.66	17.3	19.73	20.90	17.3	30.46	17.95	17.4	56.45	36.21
18.0	28.15	25.02	18.1	44.76	42.37	18.3	19.19	20.90	18.3	28.91	18.07	18.4	56.29	36.50
19.0	28.13	24.70	19.1	44.68	42.10	19.3	18.68	20.89	19.3	27.41	18.16	19.4	56.13	36.76
20.0	28.11	24.40	20.1	44.60	41.83	20.3	18.19	20.86	20.3	25.98	18.24	20.4	55.97	37.01
21.0	28.09	24.12	21.1	44.52	41.59	21.3	17.74	20.84	21.3	24.63	18.32	21.4	55.83	37.25
22.0	28.07	23.86	22.1	44.45	41.37	22.2	17.31	20.84	22.3	23.37	18.40	22.4	55.71	37.49
23.0	28.04	23.60	23.1	44.38	41.15	23.2	16.89	20.85	23.3	22.17	18.50	23.4	55.60	37.72
24.0	28.00	23.34	24.1	44.29	40.94	24.2	16.47	20.88	24.3	20.98	18.62	24.4	55.51	37.96
25.0	27.94	23.08	25.1	44.20	40.73	25.2	16.02	20.92	25.3	19.73	18.74	25.4	55.41	38.24
26.0	27.88	22.80	26.1	44.10	40.51	26.2	15.53	20.96	26.3	18.40	18.88	26.4	55.31	38.54
27.0	27.82	22.50	27.1	43.99	40.27	27.2	15.02	20.98	27.3	16.94	19.02	27.4	55.19	38.83
28.0	27.78	22.18	28.1	43.90	39.99	28.2	14.48	20.99	28.3	15.35	19.15	28.4	55.03	39.13
29.0	27.76	21.83	29.1	43.81	39.69	29.2	13.91	20.97	29.3	13.67	19.23	29.4	54.84	39.43
30.0	27.75	21.48	30.1	43.74	39.39	30.2	13.35	20.92	30.3	11.96	19.29	30.4	54.62	39.71
31.0	27.77	21.15	31.1	43.68	39.06	31.2	12.82	20.83	31.3	10.29	19.32	31.4	54.39	39.96
10.74	-10.69		8.54	-8.49		24.62	-24.60		75.22	-75.21		15.97	-15.94	
12 ^h 45 ^m	43 ^s .33		14 ^h 12 ^m	50 ^s .81		18 ^h 3 ^m	48 ^s .95		19 ^h 21 ^m	19 ^s .15		22 ^h 15 ^m	19 ^s .18	
14° 39'	3'' .86		-83° 16'	13'' .94		-87° 39'	53'' .07		-89° 13'	57'' .47		-86° 24'	39'' .46	

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ζ Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m ° '			h m ° '			h m ° '			h m ° '			h m ° '	
Oct.	12 45	-84 39	Oct.	14 12	-83 16	Oct.	18 3	-87 40	Oct.	19 22	-89 14	Oct.	22 15	-86 24
	s "			s "			s "			s "			s "	
1.0	27.77	21.15	1.1	43.68	39.06	1.2	72.82	20.83	1.3	70.29	19.32	1.4	54.39	39.96
2.0	27.80	20.83	2.1	43.64	38.75	2.2	72.32	20.73	2.3	68.70	19.33	2.4	54.15	40.18
2.9	27.84	20.53	3.1	43.61	38.45	3.2	71.86	20.63	3.3	67.17	19.33	3.4	53.92	40.39
3.9	27.88	20.24	4.1	43.58	38.18	4.2	71.42	20.54	4.3	65.73	19.34	4.4	53.71	40.58
4.9	27.93	19.97	5.1	43.55	37.92	5.2	71.00	20.45	5.3	64.38	19.34	5.4	53.52	40.78
5.9	27.95	19.71	6.1	43.52	37.66	6.2	70.59	20.38	6.3	63.06	19.37	6.4	53.34	40.98
6.9	27.97	19.45	7.0	43.47	37.41	7.2	70.17	20.33	7.3	61.73	19.41	7.4	53.16	41.20
7.9	27.98	19.18	8.0	43.42	37.16	8.2	69.72	20.29	8.3	60.35	19.46	8.4	52.99	41.43
8.9	27.99	18.89	9.0	43.36	36.89	9.2	69.24	20.24	9.3	58.88	19.52	9.4	52.81	41.68
9.9	28.00	18.58	10.0	43.29	36.62	10.2	68.74	20.18	10.3	57.32	19.57	10.4	52.60	41.93
10.9	28.01	18.26	11.0	43.24	36.31	11.2	68.22	20.11	11.3	55.68	19.61	11.4	52.38	42.19
11.9	28.02	17.92	12.0	43.19	35.99	12.2	67.69	20.02	12.2	53.98	19.64	12.4	52.14	42.44
12.9	28.07	17.58	13.0	43.15	35.67	13.2	67.16	19.91	13.2	52.24	19.64	13.4	51.87	42.67
13.9	28.12	17.24	14.0	43.13	35.32	14.2	66.64	19.78	14.2	50.48	19.62	14.4	51.58	42.90
14.9	28.20	16.90	15.0	43.11	34.98	15.2	66.12	19.63	15.2	48.73	19.59	15.4	51.29	43.11
15.9	28.28	16.58	16.0	43.10	34.64	16.2	65.63	19.45	16.2	47.04	19.52	16.4	50.98	43.29
16.9	28.38	16.28	17.0	43.11	34.31	17.2	65.18	19.27	17.2	45.43	19.44	17.4	50.68	43.46
17.9	28.49	15.99	18.0	43.13	34.01	18.2	64.77	19.09	18.2	43.92	19.35	18.4	50.39	43.60
18.9	28.60	15.73	19.0	43.15	33.72	19.2	64.38	18.91	19.2	42.50	19.27	19.4	50.12	43.74
19.9	28.69	15.48	20.0	43.17	33.44	20.2	64.01	18.76	20.2	41.16	19.19	20.3	49.86	43.87
20.9	28.77	15.25	21.0	43.18	33.18	21.2	63.65	18.62	21.2	39.86	19.13	21.3	49.64	44.00
21.9	28.85	15.02	22.0	43.18	32.93	22.2	63.28	18.50	22.2	38.57	19.09	22.3	49.41	44.16
22.9	28.92	14.76	23.0	43.17	32.68	23.2	62.88	18.38	23.2	37.22	19.06	23.3	49.18	44.33
23.9	28.98	14.49	24.0	43.16	32.40	24.2	62.46	18.26	24.2	35.76	19.03	24.3	48.93	44.51
24.9	29.04	14.21	24.9	43.15	32.10	25.2	62.01	18.13	25.2	34.20	18.98	25.3	48.67	44.70
25.9	29.12	13.91	25.9	43.16	31.78	26.2	61.54	17.95	26.2	32.56	18.92	26.3	48.37	44.88
26.9	29.23	13.60	26.9	43.18	31.45	27.2	61.08	17.75	27.2	30.86	18.82	27.3	48.06	45.05
27.9	29.37	13.30	27.9	43.20	31.10	28.2	60.63	17.52	28.2	29.19	18.70	28.3	47.71	45.19
28.9	29.51	13.01	28.9	43.25	30.76	29.1	60.23	17.27	29.2	27.59	18.54	29.3	47.36	45.30
29.9	29.67	12.74	29.9	43.32	30.43	30.1	59.86	17.02	30.2	26.10	18.37	30.3	47.01	45.38
30.9	29.84	12.50	30.9	43.39	30.13	31.1	59.53	16.77	31.2	24.72	18.20	31.3	46.67	45.45
31.9	30.00	12.27	31.9	43.46	29.86	32.1	59.25	16.52	32.2	23.44	18.03	32.3	46.37	45.51
10.73 -10.69			8.54 -8.48			24.62 -24.60			75.27 -75.26			15.98 -15.95		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3''.86			-83° 16' 13''.94			-87° 39' 53''.07			-89° 13' 57''.47			-86° 24' 39''.46		

APPARENT PLACES OF CIRCUMPOLAR STARS

FOR THE UPPER TRANSIT AT WASHINGTON

ζ Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
	h m	° '		h m	° '		h m	° '		h m	° '		h m	° '
Nov.	12 45	-84 39	Nov.	14 12	-83 16	Nov.	18 3	-87 40	Nov.	19 21	-89 14	Nov.	22 15	-86 24
	s	"		s	"		s	"		s	"		s	"
1.9	30.15	12.07	1.9	43.53	29.60	1.1	59.25	16.52	1.2	83.44	18.03	1.3	46.37	45.51
2.9	30.29	11.87	2.9	43.58	29.35	2.1	58.96	16.30	2.2	82.23	17.88	2.3	46.07	45.57
3.9	30.41	11.66	3.9	43.63	29.10	3.1	58.68	16.10	3.2	81.05	17.74	3.3	45.80	45.63
4.9	30.53	11.44	4.9	43.67	28.84	4.1	58.39	15.90	4.2	79.84	17.62	4.3	45.53	45.72
5.9	30.65	11.21	5.9	43.71	28.57	5.1	58.07	15.71	5.2	78.58	17.51	5.3	45.25	45.82
6.9	30.78	10.97	6.9	43.75	28.28	6.1	57.73	15.52	6.2	77.25	17.40	6.3	44.97	45.92
7.9	30.91	10.72	7.9	43.80	27.98	7.1	57.36	15.32	7.2	75.83	17.28	7.3	44.67	46.03
8.9	31.07	10.45	8.9	43.85	27.68	8.1	56.98	15.10	8.2	74.37	17.14	8.3	44.35	46.13
9.9	31.23	10.19	9.9	43.93	27.35	9.1	56.61	14.85	9.2	72.87	16.99	9.3	44.02	46.23
10.9	31.41	9.93	10.9	44.01	27.03	10.1	56.25	14.58	10.2	71.36	16.81	10.3	43.65	46.32
11.9	31.61	9.69	11.9	44.10	26.72	11.1	55.92	14.29	11.2	69.87	16.61	11.3	43.28	46.39
12.9	31.82	9.46	12.9	44.21	26.42	12.1	55.60	14.00	12.2	68.43	16.39	12.3	42.90	46.42
13.9	32.03	9.27	13.9	44.33	26.13	13.1	55.31	13.69	13.2	67.08	16.14	13.3	42.53	46.44
14.9	32.24	9.09	14.9	44.44	25.86	14.1	55.07	13.37	14.2	65.84	15.90	14.3	42.17	46.44
15.9	32.45	8.91	15.9	44.56	25.62	15.1	54.87	13.06	15.2	64.72	15.65	15.3	41.83	46.42
16.9	32.64	8.78	16.9	44.67	25.39	16.1	54.70	12.77	16.2	63.71	15.42	16.3	41.51	46.39
17.9	32.82	8.64	17.9	44.78	25.18	17.1	54.54	12.49	17.2	62.77	15.20	17.3	41.21	46.36
18.9	33.00	8.49	18.9	44.87	24.98	18.1	54.38	12.24	18.1	61.86	14.99	18.3	40.93	46.35
19.9	33.17	8.34	19.9	44.96	24.76	19.1	54.21	12.00	19.1	60.91	14.79	19.3	40.64	46.35
20.9	33.33	8.18	20.9	45.05	24.52	20.1	54.01	11.77	20.1	59.92	14.62	20.3	40.36	46.36
21.9	33.51	7.99	21.9	45.14	24.28	21.1	53.78	11.53	21.1	58.83	14.43	21.3	40.06	46.38
22.9	33.71	7.79	22.9	45.24	24.01	22.1	53.54	11.27	22.1	57.65	14.23	22.3	39.73	46.40
23.9	33.92	7.60	23.9	45.37	23.72	23.1	53.29	10.97	23.1	56.42	13.99	23.3	39.39	46.41
24.9	34.16	7.41	24.9	45.50	23.44	24.1	53.07	10.65	24.1	55.20	13.73	24.3	39.00	46.39
25.9	34.41	7.26	25.9	45.66	23.18	25.1	52.87	10.30	25.1	54.04	13.44	25.2	38.62	46.35
26.8	34.67	7.13	26.9	45.83	22.95	26.1	52.72	9.93	26.1	53.00	13.13	26.2	38.24	46.27
27.8	34.92	7.04	27.9	46.00	22.73	27.1	52.62	9.57	27.1	52.09	12.81	27.2	37.87	46.16
28.8	35.17	6.95	28.9	46.16	22.54	28.1	52.56	9.23	28.1	51.30	12.49	28.2	37.54	46.04
29.8	35.40	6.88	29.9	46.31	22.37	29.1	52.52	8.91	29.1	50.62	12.20	29.2	37.22	45.93
30.8	35.62	6.81	30.9	46.45	22.20	30.1	52.50	8.61	30.1	50.00	11.92	30.2	36.92	45.82
31.8	35.82	6.75	31.9	46.59	22.03	31.1	52.45	8.31	31.1	49.38	11.65	31.2	36.65	45.72
10.73 -10.68			8.54 -8.48			24.60 -24.58			75.16 -75.16			15.98 -15.95		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3''.86			-83° 16' 13''.94			-87° 39' 53''.07			-89° 13' 57''.47			-86° 24' 39''.46		

APPARENT PLACES OF CIRCUMPOLAR STARS
FOR THE UPPER TRANSIT AT WASHINGTON.

ι Octantis. Mag. 5.4			δ Octantis. Mag. 4.1			χ Octantis. Mag. 5.2			σ Octantis. Mag. 5.5			υ Octantis. Mag. 5.7		
Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.	Mean Solar Date.	Right Ascen- sion.	Declina- tion South.
Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '	Dec.	h m	° '
	s	"		s	"		s	"		s	"		s	"
1.8	35.82	6.75	1.9	46.59	22.03	1.1	52.45	68.31	1.1	49.38	11.65	1.2	36.65	45.72
2.8	36.02	6.66	2.9	46.72	21.86	2.1	52.39	68.04	2.1	48.72	11.39	2.2	36.37	45.64
3.8	36.23	6.56	3.9	46.85	21.67	3.1	52.31	67.76	3.1	47.99	11.14	3.2	36.09	45.57
4.8	36.44	6.45	4.9	46.99	21.48	4.1	52.22	67.48	4.1	47.23	10.90	4.2	35.80	45.50
5.8	36.67	6.34	5.9	47.13	21.26	5.0	52.12	67.19	5.1	46.42	10.64	5.2	35.49	45.44
6.8	36.90	6.23	6.9	47.27	21.03	6.0	52.01	66.89	6.1	45.56	10.37	6.2	35.16	45.36
7.8	37.14	6.12	7.9	47.44	20.82	7.0	51.91	66.56	7.1	44.70	10.07	7.2	34.82	45.27
8.8	37.40	6.03	8.9	47.61	20.61	8.0	51.82	66.21	8.1	43.85	9.76	8.2	34.47	45.17
9.8	37.68	5.94	9.9	47.80	20.41	9.0	51.77	65.85	9.1	43.06	9.42	9.2	34.11	45.04
10.8	37.96	5.88	10.9	47.99	20.21	10.0	51.76	65.48	10.1	42.36	9.08	10.2	33.76	44.90
11.8	38.24	5.85	11.9	48.20	20.05	11.0	51.78	65.11	11.1	41.78	8.73	11.2	33.41	44.72
12.8	38.51	5.85	12.9	48.40	19.92	12.0	51.84	64.73	12.1	41.34	8.36	12.2	33.09	44.53
13.8	38.77	5.86	13.9	48.60	19.81	13.0	51.94	64.38	13.1	41.00	8.00	13.2	32.79	44.33
14.8	39.01	5.88	14.9	48.78	19.72	14.0	52.07	64.05	14.1	40.75	7.68	14.2	32.52	44.13
15.8	39.25	5.90	15.9	48.96	19.64	15.0	52.20	63.74	15.1	40.57	7.37	15.2	32.27	43.93
16.8	39.47	5.92	16.9	49.12	19.55	16.0	52.30	63.46	16.1	40.38	7.06	16.2	32.03	43.76
17.8	39.68	5.92	17.9	49.28	19.45	17.0	52.39	63.18	17.1	40.15	6.78	17.2	31.81	43.60
18.8	39.91	5.90	18.8	49.44	19.34	18.0	52.46	62.90	18.1	39.85	6.50	18.2	31.56	43.44
19.8	40.15	5.88	19.8	49.61	19.20	19.0	52.51	62.61	19.1	39.47	6.22	19.2	31.30	43.30
20.8	40.41	5.86	20.8	49.80	19.06	20.0	52.54	62.29	20.1	39.04	5.91	20.2	31.01	43.14
21.8	40.68	5.84	21.8	49.99	18.92	21.0	52.59	61.94	21.1	38.57	5.57	21.2	30.70	42.97
22.8	40.97	5.84	22.8	50.21	18.78	22.0	52.67	61.58	22.1	38.16	5.20	22.2	30.37	42.76
23.8	41.26	5.87	23.8	50.44	18.66	22.9	52.79	61.21	23.1	37.85	4.81	23.2	30.04	42.53
24.8	41.56	5.94	24.8	50.67	18.58	23.9	52.96	60.81	24.0	37.67	4.42	24.2	29.74	42.28
25.8	41.85	6.03	25.8	50.89	18.53	24.9	53.17	60.44	25.0	37.64	4.03	25.2	29.46	42.00
26.8	42.12	6.13	26.8	51.10	18.49	25.9	53.41	60.10	26.0	37.73	3.64	26.2	29.20	41.72
27.8	42.37	6.23	27.8	51.31	18.47	26.9	53.69	59.77	27.0	37.91	3.29	27.2	28.98	41.45
28.8	42.60	6.33	28.8	51.52	18.46	27.9	53.94	59.46	28.0	38.12	2.95	28.2	28.78	41.19
29.8	42.83	6.42	29.8	51.70	18.43	28.9	54.18	59.18	29.0	38.31	2.63	29.2	28.59	40.95
30.8	43.06	6.51	30.8	51.87	18.40	29.9	54.40	58.90	30.0	38.46	2.32	30.2	28.39	40.71
31.8	43.29	6.58	31.8	52.06	18.36	30.9	54.61	58.63	31.0	38.54	2.02	31.2	28.17	40.49
32.8	43.54	6.64	32.8	52.26	18.29	31.9	54.81	58.34	32.0	38.58	1.71	32.1	27.96	40.28
10.73 -10.68			8.54 -8.48			24.57 -24.55			74.94 -74.93			15.98 -15.95		
12 ^h 45 ^m 43 ^s .33			14 ^h 12 ^m 50 ^s .81			18 ^h 3 ^m 48 ^s .95			19 ^h 21 ^m 19 ^s .15			22 ^h 15 ^m 19 ^s .18		
-84° 39' 3'' .86			-83° 16' 13'' .94			-87° 39' 53'' .07			-89° 13' 57'' .47			-86° 24' 39'' .46		

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.	
					a	δ						a	δ
		h	m	°	s	"			h	m	°	s	"
1	33 Piscium	0	1	— 6	.018	.25	112	4 Octantis(G.)	1	42	— 85	.039	.40
3	α Androm.		4	+ 29	.010	.13	116	ζ Ceti		47	— 11	.020	.24
4	β Cassiop.		5	+ 59	.017	.17	118	α Trianguli		48	+ 29	.022	.22
5	ε Phœnicis		5	— 46	.051	.41	117	ε Cassiop.		48	+ 63	.017	.17
6	22 Androm.		6	+ 46	.024	.28	120	ξ Piscium		49	+ 3	.018	.23
10	γ Pegasi	0	9	+ 15	.011	.14	121	β Arietis	1	50	+ 20	.013	.20
14	δ Androm.		14	+ 36	.029	.33	122	φ Phœnicis		50	— 47	.080	.81
15	ι Ceti		15	— 9	.014	.20	127	υ Ceti		56	— 22	.025	.32
16	ζ Tucanæ		16	— 65	.047	.38	126	50 Cassiop.		56	+ 72	.016	.17
19	44 Piscium		21	+ 1	.018	.22	129	α Hydri		56	— 62	.049	.34
20	β Hydri	0	21	— 78	....	...	131	γ Andr. pr.	1	59	+ 42	.016	.16
21	α Phœnicis		22	— 43	.047	.31	133	α Arietis	2	2	+ 23	.010	.14
23	12 Ceti		26	— 4	.017	.21	134	β Trianguli		4	+ 35	.018	.21
30	13 Ceti		31	— 4	.023	.30	136	55 Cassiop.		8	+ 66	.025	.24
31	ζ Cassiop.		32	+ 53	.021	.20	137	6 Persei		8	+ 51	.025	.27
32	π Androm.	0	32	+ 33	.021	.21	138	ξ ¹ Ceti	2	8	+ 8	.018	.23
35	ε Androm.		34	+ 29	.016	.19	139	μ Fornacis		9	— 31	.076	.83
36	δ Androm.		35	+ 30	.018	.22	141	γ Trianguli		12	+ 33	.024	.31
37	α Cassiop.		36	+ 56	.012	.14	142	67 Ceti		13	— 7	.021	.25
38	μ Phœnicis		37	— 47	....	.53	144	φ Eridani		13	— 52	.049	.42
39	β Ceti	0	39	— 18	.013	.17	145	ο Ceti	2	15	— 3	.018	.23
42	ο Cassiop.		40	+ 48	.034	.26	146	κ Fornacis		19	— 24	.049	.47
41	21 Cassiop.		40	+ 75	.017	.24	148	δ Hydri		20	— 69	....	...
45	ζ Androm.		43	+ 24	.019	.24	149	ι Cassiop.		22	+ 67	.025	.25
46	η Cassiop.		44	+ 57	.017	.24	153	ξ ² Ceti		24	+ 8	.014	.19
49	δ Piscium	0	44	+ 7	.014	.20	156	σ Ceti	2	28	— 16	.028	.37
52	λ Hydri		46	— 75	....	.70	157	36 H. Cassiop.		30	+ 72	.021	.22
53	20 Ceti		49	— 2	.018	.26	160	ν Ceti		31	+ 5	.020	.26
54	γ Cassiop.		51	+ 60	.018	.22	163	μ Hydri		33	— 79	.056	.70
55	μ Androm.		52	+ 38	.017	.21	161	ν Arietis		34	+ 32	.020	.26
58	α Sculptoris	0	54	— 30	.025	.23	165	δ Ceti	2	35	— 0	.014	.20
59	43 H. Cephei		57	+ 86	.010	.17	172	ε Hydri		38	— 69	....	...
61	ε Piscium	0	58	+ 7	.012	.26	170	θ Persei		38	+ 49	.021	.19
66	β Phœnicis	1	2	— 47	.050	.47	173	γ Ceti seq.		39	+ 3	.016	.20
65	μ Cassiop.		2	+ 54	.022	.27	174	π Ceti		40	— 14	.025	.25
69	η Ceti	1	4	— 11	.025	.22	175	μ Ceti	2	40	+ 10	.020	.21
71	β Androm.		5	+ 35	.013	.17	177	η Persei		44	+ 56	.010	.25
74	τ Piscium		7	+ 30	.019	.33	178	41 Arietis		45	+ 27	.020	.22
76	ζ Piscium		9	+ 7	.019	.24	179	β Fornacis		45	— 33	.050	.47
78	κ Tucanæ		13	— 69	....	...	180	σ Arietis		47	+ 15	.018	.24
79	ƒ Piscium	1	13	+ 3	.022	.29	181	τ ² Eridani	2	47	— 21	.022	.32
80	υ Piscium		15	+ 27	.022	.25	182	τ Persei		48	+ 52	.020	.19
85	θ Ceti		20	— 9	.013	.19	183	η Eridani		52	— 9	.016	.21
86	δ Cassiop.		20	+ 60	.018	.19	185	ε Arietis		54	+ 21	.016	.23
91	γ Phœnicis		25	— 44	.044	.35	184	47 H. Cephei		54	+ 79	.035	.32
90	38 Cassiop.	1	25	+ 70	.026	.28	187	θ Eridani	2	55	— 41	.056	.42
94	η Piscium		27	+ 15	.020	.19	189	α Ceti		58	+ 4	.010	.13
89	α Urs. Min.		28	+ 89	....	...	190	γ Persei		58	+ 53	.029	.20
96	40 Cassiop.		32	+ 73	.028	.25	191	τ ³ Eridani	2	59	— 24	.029	.32
97	υ Androm.		32	+ 41	.024	.26	192	ρ Persei	3	0	+ 38	.019	.24
98	π Piscium	1	32	+ 12	.022	.25	194	μ Horologii	3	2	— 60	.060	.49
99	υ Persei		33	+ 48	.018	.19	197	θ Hydri		2	— 72	.046	.47
101	α Eridani		34	— 58	....	...	195	β Persei		2	+ 41	.016	.20
103	ω Cassiop.		36	+ 68	.025	.25	199	δ Arietis		7	+ 19	.014	.17
104	ν Piscium		37	+ 5	.014	.20	202	12 Eridani		8	— 29	.022	.30
105	φ Persei	1	38	+ 50	.022	.20	200	48 H. Cephei	3	9	+ 77	.032	.32
107	τ Ceti		40	— 16	.020	.25	203	ζ Arietis		10	+ 21	.018	.29
108	ο Piscium		41	+ 9	.013	.19	204	38 Horologii(G.)		10	— 58	....	...
109	ε Sculpt.	1	42	— 25	.037	.46	206	ζ Eridani	3	12	— 9	.022	.31

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.	
					α	δ						α	δ
		h	m	°	s	"			h	m	°	s	"
209	τ Arietis	3	16	+21	.027	.32	319	η Aurigæ	5	0	+41	.021	.21
210	ε Eridani		16	-43	.056	.49	320	ε Leporis		2	-22	.021	.25
212	ι Hydri		18	-78	....	...	322	β Eridani		4	-5	.016	.21
211	α Persei		18	+50	.013	.14	327	μ Aurigæ		7	+38	.028	.29
213	ο Tauri		20	+9	.014	.21	326	19 H. Camelop.		8	+79	.025	.33
214	2 H. Camel.	3	22	+60	.028	.37	328	μ Leporis	5	9	-16	.032	.31
215	ξ Tauri		22	+9	.023	.22	329	α Aurigæ		10	+46	.012	.14
219	ζ Tauri		26	+13	.016	.22	330	β Orionis		10	-8	.009	.15
221	ε Eridani		29	-10	.014	.17	332	λ Aurigæ		13	+40	.027	.27
222	τ ^s Eridani		30	-22	.031	.40	333	τ Orionis		13	-7	.014	.24
230	δ Persei	3	37	+48	.016	.16	335	ο Columbæ	5	14	-35	.068	.60
235	δ Eridani		39	-10	.020	.24	342	γ Orionis		20	+6	.017	.21
234	ν Persei		39	+42	.024	.25	343	β Tauri		21	+29	.010	.14
237	5 H. Camel.		41	+71	.025	.29	344	17 Camelop.		22	+63	.029	.22
238	η Tauri		42	+24	.014	.17	347	β Leporis		25	-21	.025	.33
239	τ ^δ Eridani	3	43	-24	.023	.30	348	χ Aurigæ	5	27	+32	.022	.30
243	g Eridani		46	-36	.073	.63	350	δ Orionis		28	-0	.012	.16
246	γ Hydri		49	-75	.031	.29	349	Gr. 966		28	+75	.022	.22
244	ζ Persei		49	+32	.019	.22	354	α Leporis		29	-18	.018	.22
245	9 H. Camel.		50	+61	.031	.33	355	φ ¹ Orionis		30	+9	.021	.31
248	ε Persei	3	52	+40	.019	.22	359	ι Orionis	5	31	-6	.022	.25
250	ξ Persei		53	+36	.019	.22	361	ε Orionis		32	-1	.013	.17
251	γ Eridani		54	-14	.017	.19	362	ζ Tauri		32	+21	.019	.23
252	λ Tauri		56	+12	.018	.22	356	Gr. 944		34	+85	.030	.35
254	δ Reticuli		57	-62	.044	.36	366	ζ Orionis		36	-2	.016	.22
255	ν Tauri	3	59	+6	.018	.22	368	α Columbæ	5	36	-34	.024	.28
256	A Tauri	4	0	+22	.020	.23	369	ο Aurigæ		39	+50	.028	.39
260	c Persei		2	+47	.020	.22	372	ζ Leporis		43	-15	.023	.30
263	p Tauri		6	+26	.030	.37	373	κ Orionis		44	-10	.013	.19
265	ο ¹ Eridani		8	-7	.016	.23	375	δ Doradus		45	-66	....	...
264	Gr. 750	4	9	+85	.017	.24	374	ν Aurigæ	5	45	+39	.021	.26
268	μ Tauri		11	+9	.027	.47	381	31 Mensæ (G.)		47	-85	.042	.56
270	α Horologii		11	-43	.073	.69	378	δ Leporis		48	-21	.036	.37
271	α Reticuli		13	-63	.061	.54	382	α Orionis		50	+7	.008	.14
274	γ Tauri		15	+15	.013	.21	383	δ Aurigæ		52	+54	.026	.25
277	δ Tauri	4	18	+17	.017	.23	385	η Leporis	5	52	-14	.022	.22
279	υ ^s Eridani		21	-34	.046	.42	387	β Aurigæ		53	+45	.016	.16
281	ε Tauri		24	+19	.013	.20	388	θ Aurigæ		54	+37	.020	.20
284	δ Mensæ		24	-80	.058	.52	393	ι Gemin.	5	59	+23	.021	.30
285	m Persei		27	+43	.031	.34	395	ι Puppis (G.)	6	2	-45	.057	.55
288	α Tauri	4	31	+16	.009	.13	396	ν Orionis	6	3	+15	.016	.19
289	ν Eridani		32	-4	.018	.24	402	22 H. Camelop.		9	+69	.022	.26
291	α Doradus		32	-55	.054	.40	405	η Gemin.		10	+23	.014	.20
292	53 Eridani		34	-14	.023	.28	406	2 Lyncis		12	+59	.023	.22
296	τ Tauri		37	+23	.014	.23	411	ζ Can. Maj.		17	-30	.055	.44
294	Gr. 848	4	37	+76	.024	.30	412	μ Gemin.	6	18	+23	.013	.17
297	α Coeli		38	-42	.050	.46	413	φ ¹ Aurigæ		18	+49	.025	.23
298	4 Camelop.		41	+57	.027	.25	414	β Can. Maj.		19	-18	.019	.22
299	μ Eridani		41	-3	.016	.21	415	8 Monoc.		19	+5	.022	.24
303	π ³ Orionis		45	+7	.021	.22	416	α Argûs		22	-53	....	...
302	9 Camelop.	4	45	+66	.021	.19	418	10 Monoc.	6	24	-5	.017	.37
304	ι Tauri		46	+19	.023	.31	419	ν Gemin.		24	+20	.027	.21
307	π ⁵ Orionis		50	+2	.016	.22	423	8 Lyncis		30	+62	.022	.23
309	ι Aurigæ		51	+33	.014	.17	424	23 H. Camelop.		31	+80	.024	.29
312	β Camelop.		56	+60	.023	.19	425	ξ ² Can. Maj.		31	-23	.034	.35
313	ε Aurigæ	4	56	+44	.021	.19	426	51 Aurigæ	6	33	+39	.025	.31
314	ζ Aurigæ		56	+41	.017	.22	427	γ Gemin.		33	+16	.013	.17
316	ι Tauri	4	58	+21	.019	.26	429	ν Argûs		35	-43	.058	.48
318	11 Orionis	5	0	+15	.020	.35	430	S Monoc.	6	36	+10	.016	.22

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Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.	
					a	δ						a	δ
		h	m	°	s	"			h	m	°	s	"
431	ε Gemin.	6	39	+25	.014	.19	536	30 Monoc.	8	21	— 4	.017	.23
433	ξ Gemin.		40	+13	.013	.21	537	ο Urs. Maj.		23	+61	.014	.15
432	φ ⁵ Aurigæ		40	+44	.029	.24	539	θ Chamæl.		23	—77	.050	.40
434	α Can. Maj.		41	—17	....	.16	543	Gr. 1450		27	+38	.047	.43
435	18 Monoc.		43	+ 3	.020	.25	544	η Cancrī		28	+21	.019	.20
436	43 Camelop.	6	44	+69	.027	.24	545	Gr. 1446	8	30	+74	.032	.38
440	θ Gemin.		47	+34	.020	.22	547	δ Hydræ		33	+ 6	.019	.26
441	α Pictoris		47	—62	.061	.63	548	σ Hydræ		34	+ 4	.023	.27
443	ζ Mensæ		47	—81	.048	.47	554	γ Cancrī		38	+22	.016	.21
442	τ Argûs		48	—51	.069	.64	556	δ Cancrī		40	+18	.017	.21
444	15 Lyncis	6	50	+59	.023	.21	557	α Pyxidīs	8	40	—33	.053	.42
446	θ Can. Maj.		50	—12	.021	.31	558	ι Cancrī		41	+29	.025	.26
451	ε Can. Maj.		55	—29	.017	.23	559	ε Hydræ		42	+ 7	.014	.19
454	ζ Gemin.		59	+21	.016	.19	560	δ Argûs		42	—54	.053	.41
455	ο ² Can. Maj.	6	59	—24	.025	.29	566	σ Cancrī		49	+31	.022	.31
456	γ Can. Maj.	7	0	—16	.021	.28	567	ζ Hydræ	8	51	+ 6	.018	.24
449	51 H. Cephei		0	+87	....	...	569	ι Urs. Maj.		53	+48	.016	.17
460	δ Can. Maj.		5	—26	.020	.24	571	α Cancrī		54	+12	.015	.20
461	63 Aurigæ		6	+39	.021	.26	574	β ¹ Carinæ		55	—59	.044	.43
464	51 Gemin.		8	+16	.023	.37	576	κ Urs. Maj.	8	58	+48	.018	.19
465	γ ² Volantis	7	9	—70	.071	.64	582	σ Urs. Maj.	9	3	+67	.020	.28
467	25 H. Camel.		13	+83	.025	.24	583	κ Cancrī		3	+11	.016	.22
469	λ Gemin.		13	+17	.013	.22	585	λ Argûs		5	—43	.039	.32
470	π Argûs		14	—37	.046	.34	590	ζ Octantis		10	—85	.041	.38
471	δ Gemin.		15	+22	.014	.17	589	θ Hydræ		10	+ 3	.014	.19
474	δ Volantis	7	17	—68	.061	.64	591	β Argûs	9	12	—69	.035	.28
480	7 Octant.(G.)		18	—87	.053	.46	593	83 Cancrī		14	+18	.018	.24
476	ι Gemin.		20	+28	.014	.22	594	ι Argûs		15	—59	....	...
477	η Can. Maj.		21	—29	.021	.25	595	40 Lyncis		16	+35	.018	.21
478	Gr. 1308		22	+69	.028	.26	596	θ Pyxidīs		18	—26	.046	.61
479	β Can. Min.	7	22	+ 8	.014	.19	599	α Hydræ	9	23	— 8	.010	.15
481	ρ Gemin.		24	+32	.021	.27	601	h Urs. Maj.		25	+63	.019	.19
483	σ Argûs		26	—43	.060	.46	600	ι H. Draco.		25	+82	.016	.20
484	α ² Gemin.		29	+32	.019	.14	603	d Urs. Maj.		27	+70	.025	.24
488	25 Monoc.		33	— 4	.040	.42	604	θ Urs. Maj.		27	+52	.017	.17
492	α Can. Min.	7	35	+ 5	....	.15	605	ε Leonis	9	27	+12	.024	.30
493	24 Lyncis		36	+59	.033	.29	606	φ Argûs		27	—40	.056	.51
495	κ Gemin.		39	+25	.018	.22	607	10 Leo. Min.		29	+37	.020	.27
496	β Gemin.		40	+28	.010	.12	620	ζ Chamæl.		36	—81	.047	.48
499	4 Puppis		42	—14	.028	.36	619	ο Leonis		37	+10	.014	.16
502	ξ Argûs	7	46	—25	.021	.27	622	θ Antliæ	9	40	—27	.057	.49
505	φ Gemin.		48	+27	.018	.28	623	ε Leonis		41	+24	.014	.17
506	26 Lyncis		48	+48	.022	.30	626	υ Urs. Maj.		45	+59	.013	.17
507	Gr. 1374		50	+74	.029	.32	627	υ Argûs		45	—65	.049	.38
514	χ Argûs		55	—53	.052	.40	629	6 Sextantis		47	— 4	.030	.35
515	ω Cancrī	7	56	+26	.022	.30	630	μ Leonis	9	48	+26	.014	.19
517	χ Gemin.	7	58	+28	.018	.24	632	Gr. 1586		51	+73	.026	.32
520	27 Lyncis	8	2	+52	.022	.23	634	19 Leo. Min.		52	+41	.022	.24
523	ρ Argûs		4	—24	.018	.24	636	φ Argûs		54	—54	.045	.37
522	3 H. Ur. Maj.		4	+69	.025	.29	638	π Leonis	9	56	+ 8	.012	.20
525	γ Argûs	8	7	—47	.051	.44	641	η Leonis	10	3	+17	.022	.22
526	ζ Cancrī		7	+18	.022	.25	642	α Leonis		4	+12	.015	.13
527	Br. 1147		9	+76	.026	.31	644	λ Hydræ		6	—12	.019	.24
528	20 Puppis		9	—16	.023	.32	645	q Velorum		11	—42	.088	.76
518	Gr. 1119		12	+89	.025	...	646	32 Urs. Maj.		12	+66	.024	.25
529	β Cancrī	8	12	+ 9	.013	.24	648	ζ Leonis	10	12	+24	.018	.22
533	31 Lyncis		17	+43	.027	.22	647	λ Urs. Maj.		12	+43	.017	.16
534	d ¹ Cancrī		18	+19	.022	.29	653	γ Leonis <i>pr.</i>		15	+20	.019	.15
535	ε Argûs	8	21	—59	.038	.33	657	μ Urs. Maj.	10	17	+42	.016	.19

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Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.	
				α	δ					α	δ
		$^{\text{h}} \quad ^{\text{m}}$	$^{\circ}$	$^{\text{s}}$	$''$			$^{\text{h}} \quad ^{\text{m}}$	$^{\circ}$	$^{\text{s}}$	$''$
658	30 H. Ur. Maj.	10 18	+66	.031	.27	770	β Chamæl.	12 13	-79	.037	.32
659	30 H. Camel.	21	+83	.026	.30	772	Br. 1672	14	+88	.016	.22
661	μ Hydræ	22	-16	.018	.22	773	η Virginis	15	- 0	.013	.17
662	31 Leo. Min.	23	+37	.019	.24	780	α^1 Crucis	22	-63	....	...
664	α Antliæ	23	-31	.044	.35	787	20 Comæ	25	+21	.034	.38
666	36 Urs. Maj.	10 25	+56	.022	.25	786	δ Corvi	12 25	-16	.018	.22
668	9 H. Draco.	28	+76	.019	.21	789	γ Crucis	26	-57	.084	.37
669	ρ Leonis	28	+10	.016	.21	791	8 Can. Ven.	30	+42	.022	.23
679	33 Sextantis	37	- 1	.024	.31	793	κ Draconis	30	+70	.018	.14
683	41 Leo. Min.	39	+24	.022	.26	792	β Corvi	30	-23	.019	.21
684	θ Argûs	10 40	-64	.052	.41	795	24 Comæ seq.	12 31	+19	.025	.30
685	42 Leo. Min.	41	+31	.019	.28	796	α Muscæ	32	-69	.063	.51
687	η Argûs	42	-59	....	...	799	χ Virginis	35	- 8	.024	.31
688	μ Argûs	43	-49	.049	.37	800	γ Centauri	37	-48	.041	.33
689	ι Leonis	45	+11	.015	.20	801	γ Virginis	37	- 1	.018	.24
691	δ^2 Chamæl.	10 45	-80	.047	.39	802	ρ Virginis	12 37	+11	.023	.29
690	ν Hydræ	45	-16	.022	.24	803	76 Urs. Maj.	38	+63	.034	.26
692	46 Leo. Min.	48	+35	.019	.21	808	β Crucis	43	-59	.034	.29
694	54 Leonis	51	+25	.027	.35	810	ι Octantis	46	-85	.046	.37
696	ι Antliæ	53	-37	.072	.95	812	31 Comæ	47	+28	.024	.27
695	Gr. 1706	10 53	+78	.034	.40	814	32 H. Camel.	12 48	+84	.021	.23
698	α Crateris	56	-18	.020	.25	813	π Centauri	49	-40	.068	.62
699	d Leonis	56	+ 4	.018	.24	816	ϵ Urs. Maj.	50	+56	.017	.19
701	β Urs. Maj.	57	+57	.017	.16	817	δ Virginis	51	+ 4	.013	.17
702	α Urs. Maj.	10 58	+62	.016	.15	818	α Can. Ven.	52	+39	.014	.17
704	η Octantis	11 0	-84	.044	.42	820	δ Muscæ	12 56	-71	.017	.33
703	χ Leonis	1	+ 8	.013	.19	821	ϵ Virginis	12 58	+11	.013	.17
706	ρ^4 Leonis	2	+ 2	.022	.25	827	θ Virginis	13 5	- 5	.014	.17
708	ψ Urs. Maj.	5	+45	.016	.17	830	43 Comæ	8	+28	.019	.25
710	β Crateris	7	-22	.021	.33	836	20 Can. Ven.	14	+41	.024	.24
712	δ Leonis	11 9	+21	.014	.16	838	γ Hydræ	13 14	-23	.022	.35
713	θ Leonis	10	+16	.019	.21	839	ι Centauri	16	-36	.056	.43
718	ν Urs. Maj.	14	+34	.021	.21	842	ζ^1 Urs. Maj.	20	+55	.020	.19
719	δ Crateris	15	-14	.017	.19	843	α Virginis	21	-11	.008	.14
720	σ Leonis	17	+ 7	.014	.19	846	Gr. 2001	24	+73	.026	.31
721	π Centauri	11 17	-54	....	...	845	70 Virginis	13 24	+14	.025	.31
723	ι Leonis	19	+11	.018	.21	847	κ Octantis	27	-85	.039	.35
727	τ Leonis	23	+ 3	.016	.21	852	ζ Virginis	30	- 0	.010	.17
730	λ Draconis	26	+70	.016	.16	854	17 H. Can. V.	31	+38	.041	.42
731	ξ Hydræ	29	-31	.050	.39	857	ϵ Centauri	34	-53	.039	.34
733	λ Centauri	11 32	-63	.053	.48	859	m Virginis	13 37	- 8	.015	.22
734	ν Leonis	32	- 0	.016	.18	863	τ Boötis	43	+18	.018	.19
735	π Chamæl.	34	-75	.079	.80	866	η Urs. Maj.	44	+50	.012	.14
737	3 Draconis	38	+67	.025	.25	867	89 Virginis	45	-18	.027	.35
738	ξ Crateris	40	-18	.019	.29	871	ζ Centauri	50	-47	.042	.33
740	χ Urs. Maj.	11 41	+48	.016	.17	872	η Boötis	13 51	+19	.012	.17
744	β Leonis	45	+15	.010	.14	878	θ Apodis	57	-76	....	...
745	β Virginis	46	+ 2	.012	.14	879	τ Virginis	57	+ 2	.013	.18
747	Gr. 1830	48	+38	.037	.32	880	11 Boötis	57	+28	.023	.26
748	γ Urs. Maj.	49	+54	.012	.14	881	β Centauri	13 58	-60	....	...
753	π Virginis	11 56	+ 7	.016	.21	882	π Hydræ	14 1	-26	.021	.26
758	σ Virginis	12 1	+ 9	.016	.15	883	θ Centauri	2	-36	.044	.33
760	δ Centauri	4	-50	.067	.46	885	α Draconis	2	+65	.016	.17
762	ϵ Corvi	6	-22	.020	.23	888	d Boötis	6	+26	.023	.38
763	4 H. Draco.	8	+78	.017	.19	889	κ Virginis	8	-10	.013	.21
765	δ Crucis	12 11	-58	.058	.45	890	4 Urs. Min.	14 9	+78	.018	.24
766	δ Urs. Maj.	11	+58	.020	.17	891	ι Virginis	11	- 6	.017	.21
767	γ Corvi	11	-17	.019	.20	893	α Boötis	12	+20	.008	.13
768	2 Can. Ven.	12 12	+41	.032	.32	892	δ Octantis	14 13	-83	.035	.30

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Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.	
				α	δ					α	δ
		h m	°	s	"			h m	°	s	"
894	λ Boötis	14 13	+46	.019	.21	1011	ε Cor. Bor.	15 54	+27	.023	.24
898	λ Virginis	14	-13	.017	.24	1012	δ Scorp̄ii	15 55	-22	.020	.26
901	2 Libræ	19	-11	.025	.33	1019	θ Draconis	16 0	+59	.018	.17
904	θ Boötis	22	+52	.018	.17	1017	β Scorp̄ii	0	-20	.014	.17
905	ι Boötis	22	+20	.021	.26	1021	κ Herculis	4	+17	.028	.33
907	φ Virginis	14 24	- 2	.018	.25	1026	φ Herculis	16 6	+45	.025	.22
911	5 Urs. Min.	28	+76	.019	.21	1027	Gr. 2320	6	+68	.032	.35
910	ρ Boötis	28	+31	.016	.19	1023	δ ¹ Apodis	7	-78	.053	.49
912	γ Boötis	29	+39	.017	.21	1030	δ Ophiuchi	10	- 3	.012	.17
914	η Centauri	30	-42	.045	.37	1031	σ Cor. Bor. seq.	11	+34	.037	.42
915	σ Boötis	14 31	+30	.025	.32	1034	19 Urs. Min.	16 13	+76	.029	.23
917	α ² Centauri	34	-60	....	...	1032	γ ² Normæ	13	-50	.049	.38
919	33 Boötis	36	+45	.034	.33	1033	ε Ophiuchi	14	- 4	.014	.22
921	α Apodis	37	-79	.044	.47	1035	σ Scorp̄ii	16	-25	.019	.28
926	μ Virginis	38	- 5	.014	.21	1036	τ Herculis	17	+47	.022	.20
930	ε Boötis	14 41	+27	.016	.16	1039	γ Herculis	16 18	+19	.016	.21
932	109 Virginis	42	+ 2	.018	.22	1045	η Urs. Min.	20	+76	.022	.22
934	8 Libræ	46	-16	.018	.20	1041	γ Apodis	20	-79	.033	.38
936	α Libræ	46	-16	.010	.14	1046	ω Herculis	21	+14	.030	.37
941	Gr. 2164	49	+60	.033	.35	1050	η Draconis	23	+62	.018	.17
944	β Urs. Min.	14 51	+75	.016	.16	1051	α Scorp̄ii	16 24	-26	.013	.21
945	ξ ² Libræ	52	-11	.018	.23	1056	β Herculis	26	+22	.018	.21
946	Piazzī 221	52	+15	.025	.29	1055	λ Ophiuchi	27	+ 2	.017	.22
948	β Lupi	53	-43	.054	.45	1059	A Draconis	28	+69	.022	.19
950	δ Libræ	56	- 8	.026	.25	1061	τ Scorp̄ii	30	-28	.021	.25
952	β Boötis	14 59	+41	.020	.22	1062	σ Herculis	16 31	+43	.017	.18
953	γ Scorp̄ii	14 59	-25	.024	.29	1063	ζ Ophiuchi	32	-10	.014	.20
955	φ Boötis	15 1	+27	.018	.22	1065	24 Scorp̄ii	37	-18	.022	.30
957	c Boötis	3	+25	.030	.33	1067	ζ Herculis	38	+32	.016	.17
962	Gr. 2283	5	+88	.023	.29	1068	α Tri. Aust.	39	-69	.036	.29
959	ζ Lupi	15 6	-52	.059	.51	1069	η Herculis	16 40	+39	.015	.17
960	ι Libræ	7	-19	.021	.24	1071	Gr. 2377	44	+57	.038	.45
963	γ Tri. Aust.	11	-68	.044	.36	1073	ε Scorp̄ii	45	-34	.040	.33
965	3 Serp̄entis	11	+ 5	.029	.31	1078	49 Herculis	48	+15	.024	.29
966	δ Boötis	12	+34	.018	.23	1083	ε ¹ Aræ	53	-53	.056	.50
967	β Libræ	15 12	- 9	.013	.17	1084	κ Ophiuchi	16 54	+10	.014	.17
976	γ Urs. Min.	21	+72	.018	.16	1087	ε Urs. Min.	55	+82	.018	.16
975	μ Boötis pr.	21	+38	.019	.22	1086	30 Ophiuchi	56	- 4	.035	.39
977	τ ¹ Serp̄entis	22	+16	.026	.36	1088	ε Herculis	57	+31	.016	.21
979	ι Draconis	23	+59	.025	.21	1089	d Herculis	16 58	+34	.026	.30
973	ρ Octantis	15 23	-84	.037	.38	1092	η Ophiuchi	17 5	-16	.016	.17
978	32 Libræ	23	-16	.018	.28	1093	η Scorp̄ii	6	-43	.044	.34
980	β Cor. Bor.	24	+29	.025	.22	1094	ζ Draconis	9	+66	.020	.19
981	ν ¹ Boötis	28	+41	.023	.31	1096	α Herculis	11	+14	.010	.14
984	γ Lupi (mean)	29	-41	.043	.35	1098	δ Herculis	11	+25	.020	.24
986	γ Libræ	15 31	-14	.021	.24	1100	π Herculis	17 12	+37	.018	.22
987	α Cor. Bor.	31	+27	.010	.13	1101	59 Apodis (G.)	15	-81	.073	.74
993	ζ Cor. Bor. seq.	36	+37	.027	.36	1105	θ Ophiuchi	17	-25	.019	.21
997	α Serp̄entis	40	+ 7	.010	.13	1106	w Herculis	17	+33	.027	.30
998	β Serp̄entis	42	+16	.018	.21	1107	β Aræ	18	-55	.069	.49
999	κ Serp̄entis	15 45	+18	.024	.25	1109	b Ophiuchi	17 21	-24	.018	.29
1000	μ Serp̄entis	45	- 3	.019	.35	1111	σ Ophiuchi	22	+ 4	.017	.22
1002	12 H. Draco.	45	+63	.028	.32	1112	δ Aræ	23	-61	....	...
1003	ε Serp̄entis	46	+ 5	.014	.19	1115	α Aræ	25	-50	.056	.46
1006	ζ Urs. Min.	47	+78	.016	.15	1117	λ Herculis	27	+26	.031	.37
1004	β Tri. Aust.	15 47	-63	.059	.45	1118	λ Scorp̄ii	17 28	-37	.058	.47
1005	λ Libræ	48	-20	.026	.36	1119	β Draconis	28	+52	.014	.15
1009	γ Serp̄entis	52	+16	.016	.23	1123	α Ophiuchi	31	+13	.010	.14
1010	π Scorp̄ii	15 54	-26	.023	.29	1125	ξ Serp̄entis	17 33	-15	.024	.24

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Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.	Decl. 1913.	Mean Error 1920.	
				α	δ					α	δ
		$^{\text{h}}$ $^{\text{m}}$	$^{\circ}$	$^{\text{s}}$	$''$			$^{\text{h}}$ $^{\text{m}}$	$^{\circ}$	$^{\text{s}}$	$''$
1131	ϵ Herculis	17 37	+46	.018	.17	1240	δ Draconis	19 13	+68	.016	.16
1129	η Pavonis	37	-65	.067	.58	1239	d Sagittarii	13	-19	.014	.29
1132	ω Draconis	37	+69	.021	.21	1241	θ Lyræ	13	+38	.025	.34
1134	β Ophiuchi	39	+ 5	.013	.17	1242	ω Aquilæ	14	+11	.019	.21
1135	ϵ^1 Scorpii	41	-40	.066	.54	1243	κ Cygni	15	+53	.019	.19
1137	μ Herculis	17 43	+28	.014	.19	1248	τ Draconis	19 17	+73	.019	.20
1140	ψ Draconis	43	+72	.021	.20	1251	δ Aquilæ	21	+ 3	.012	.17
1138	γ Ophiuchi	44	+ 3	.017	.21	1224	σ Octantis	21	-89	.025	.22
1145	89 Herculis	52	+26	.025	.33	1259	β Cygni	27	+28	.014	.22
1146	ξ Draconis	52	+57	.021	.21	1260	ι Cygni	28	+52	.020	.19
1147	θ Herculis	17 53	+37	.017	.21	1264	μ Aquilæ	19 30	+ 7	.024	.28
1150	35 Draconis	53	+77	.022	.23	1265	h Sagittarii	31	-25	.019	.26
1148	ν Ophiuchi	54	-10	.016	.22	1266	κ Aquilæ	32	- 7	.018	.28
1149	ξ Herculis	54	+29	.034	.30	1269	θ Cygni	34	+50	.019	.21
1151	γ Draconis	55	+51	.013	.16	1271	54 Sagittarii	36	-16	.022	.30
1152	67 Ophiuchi	17 56	+ 3	.031	.26	1273	β Sagittæ	19 37	+17	.016	.26
1156	θ Aræ	18 0	-50	.056	.50	1281	15 Cygni	41	+37	.029	.29
1158	γ Sagittarii	0	-30	.021	.39	1280	f Sagittarii	41	-20	.020	.30
1164	δ Urs. Min.	0	+87	....	...	1282	γ Aquilæ	42	+10	.009	.15
1159	70 Ophiuchi	1	+ 3	.022	.26	1283	δ Cygni	42	+45	.021	.18
1160	72 Ophiuchi	18 3	+10	.016	.19	1284	δ Sagittæ	19 44	+18	.017	.23
1153	χ Octantis	4	-88	.034	.30	1286	α Aquilæ	47	+ 9	.010	.14
1161	σ Herculis	4	+29	.019	.22	1288	η Aquilæ	48	+ 1	.022	.26
1166	μ Sagittarii	9	-21	.016	.19	1290	ϵ Draconis	48	+70	.024	.19
1169	η Sagittarii	12	-37	.057	.50	1289	ι Sagittarii	49	-42	.073	.62
1170	Gr. 2533	18 13	+42	.035	.40	1291	ϵ Pavonis	19 51	-73	...	...
1171	36 Draconis	13	+64	.020	.21	1292	β Aquilæ	51	+ 6	.008	.14
1173	δ Sagittarii	15	-30	.020	.25	1297	γ Sagittæ	55	+19	.017	.22
1174	η Serpentis	17	- 3	.016	.17	1299	c Sagittarii	19 57	-28	.017	.24
1175	ϵ Sagittarii	18	-34	.055	.46	1304	τ Aquilæ	20 0	+ 7	.022	.33
1178	109 Herculis	18 20	+22	.018	.21	1308	θ Aquilæ	20 7	- 1	.013	.18
1179	α Telescopii	21	-46	.049	.41	1314	σ Cygni seq.	11	+46	.019	.21
1182	λ Sagittarii	23	-25	.017	.22	1318	κ Cephei	12	+77	.018	.19
1185	χ Draconis	23	+73	.020	.20	1319	24 Vulpeculæ	13	+24	.025	.30
1187	c Serpentis	25	- 2	.027	.38	1320	α^2 Capricorni	13	-13	.012	.17
1189	ι Aquilæ	18 30	- 8	.013	.25	1321	β Capricorni	20 16	-15	.022	.21
1190	ζ Pavonis	33	-72	.016	.40	1324	α Pavonis	19	-57	....	...
1193	α Lyræ	34	+39	.009	.15	1325	γ Cygni	19	+40	.013	.17
1196	2 Aquilæ	38	- 9	.029	.30	1328	π Capricorni	22	-18	.019	.27
1199	ϕ Sagittarii	40	-27	.022	.26	1329	ρ Capricorni	24	-18	.018	.21
1202	110 Herculis	18 42	+20	.020	.22	1332	41 Cygni	20 26	+30	.029	.35
1204	6 Aquilæ	43	- 5	.020	.32	1336	θ Cephei	28	+63	.018	.17
1206	λ Pavonis	44	-62	.059	.52	1337	ϵ Delphini	29	+11	.013	.19
1209	β Lyræ	47	+33	.013	.16	1340	Gr. 3241	30	+72	.034	.40
1212	50 Draconis	49	+75	.031	.25	1341	α Indi	31	-48	.046	.37
1211	σ Sagittarii	18 50	-26	.018	.27	1344	β Delphini	20 33	+14	.016	.22
1213	σ Draconis	50	+59	.028	.21	1348	ν Capricorni	35	-18	.023	.33
1215	θ Serp. pr.	52	+ 4	.017	.25	1349	α Delphini	36	+16	.014	.22
1218	R Lyræ	53	+44	.025	.31	1350	β Pavonis	37	-67	...	...
1219	ϵ Aquilæ	56	+15	.017	.19	1352	α Cygni	38	+45	.010	.12
1220	γ Lyræ	18 56	+33	.018	.22	1353	δ Delphini	20 39	+15	.019	.24
1222	ζ Sagittarii	18 57	-30	.042	.37	1354	ψ Capricorni	41	-26	.028	.32
1226	ζ Aquilæ	19 1	+14	.014	.15	1356	γ Delph. seq.	43	+16	.024	.30
1227	λ Aquilæ	2	- 5	.014	.23	1357	ϵ Cygni	43	+34	.014	.21
1228	α Cor. Aust.	4	-38	.050	.42	1358	ϵ Aquarii	43	-10	.014	.19
1230	ι Lyræ	19 4	+36	.025	.29	1361	η Cephei	20 44	+61	.018	.16
1231	π Sagittarii	5	-21	.019	.23	1366	μ Aquarii	48	- 9	.016	.22
1255	λ Urs. Min.	7	+89	....	...	1364	β Indi	48	-59	.067	.58
1237	ψ Sagittarii	19 10	-25	.021	.31	1368	76 Draconis	20 49	+82	.022	.21

MEAN ERRORS OF NEWCOMB'S PLACES FOR 1920 OF STARS OF THE AMERICAN
EPHEMERIS AND NAUTICAL ALMANAC.

Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.		Cat. No.	Name.	R. A. 1913.		Decl. 1913.	Mean Error 1920.	
					α	δ						α	δ
		h	m	°	s	"			h	m	°	s	"
1369	32 Vulpeculæ	20	51	+28	.018	.22	1495	10 Lacertæ	22	35	+39	.027	.30
1371	220 Draco (H'.)		52	+80	.021	.25	1497	ϵ Pisc. Aust.		36	-27	.028	.38
1373	γ Cygni		54	+41	.022	.22	1499	ζ Pegasi		37	+10	.013	.17
1372	α Octantis		54	-77	.055	.46	1498	β Octantis		37	-82	.036	.30
1374	γ Microscop.	20	56	-33	.037	.49	1500	β Gruis		37	-47	.060	.46
1378	θ Capricorni	21	1	-18	.017	.22	1501	η Pegasi	22	39	+30	.017	.21
1380	ξ Cygni		2	+44	.018	.20	1504	λ Pegasi		42	+23	.016	.21
1381	61 Cygni <i>pr.</i>		3	+38	.020	.19	1505	ϵ Gruis		43	-52	.052	.48
1384	γ Aquarii		5	-12	.019	.28	1506	τ Aquarii		45	-14	.018	.24
1387	Br. 2777		7	+78	.023	.21	1507	μ Pegasi		46	+24	.016	.19
1386	3 Pisc. Aust.	21	8	-28	.032	.46	1510	ι Cephei	22	47	+66	.014	.17
1389	ζ Cygni		9	+30	.015	.18	1512	λ Aquarii		48	-8	.013	.19
1391	τ Cygni		11	+38	.022	.22	1513	ρ Indi		49	-71	.051	.62
1392	α Equulei		11	+5	.015	.20	1514	δ Aquarii		50	-16	.019	.25
1394	σ Cygni		14	+39	.021	.28	1516	α Pisc. Aust.		53	-30	.032	.28
1396	θ^1 Microscop.	21	15	-41	.074	.80	1520	ν Androm.	22	58	+42	.017	.22
1397	α Cephei		16	+62	.016	.14	1523	β Pegasi	23	0	+28	.020	.21
1398	ι Capricorni		17	-17	.021	.25	1525	α Pegasi		0	+15	.010	.14
1399	ι Pegasi		18	+19	.020	.27	1528	55 Pegasi		3	+9	.029	.40
1400	γ Pavonis		19	-66	.061	.43	1531	ϵ^2 Aquarii		5	-22	.023	.32
1403	ζ Capricorni	21	22	-23	.024	.31	1533	π Cephei	23	5	+75	.019	.21
1406	g Cygni		26	+46	.028	.29	1532	ι Gruis		5	-46	.064	.56
1407	β Aquarii		27	-6	.018	.18	1534	59 Pegasi		7	+8	.028	.41
1409	β Cephei		28	+70	.014	.14	1535	5 Cassiop. (H'.)		9	+57	.030	.31
1415	ξ Aquarii		33	-8	.016	.22	1536	ϕ Aquarii		10	-7	.016	.22
1416	74 Cygni	21	33	+40	.029	.31	1537	ψ Aquarii	23	11	-10	.020	.29
1417	γ Capricorni		35	-17	.018	.26	1539	γ Tucanæ		12	-59	.044	.38
1418	λ Octantis		38	-83	.065	.51	1540	γ Piscium		13	+3	.013	.16
1424	ϵ Pegasi		40	+9	.012	.18	1542	γ Sculptoris		14	-33	.053	.46
1426	11 Cephei		41	+71	.028	.26	1544	ν Cephei		15	+68	.025	.25
1428	δ Capricorni	21	42	-17	.017	.21	1546	τ Pegasi	23	16	+23	.020	.25
1431	π^2 Cygni		44	+49	.022	.24	1548	b^1 Aquarii		18	-21	.024	.32
1433	μ Capricorni		49	-14	.016	.23	1550	4 Cassiop.		21	+62	.022	.23
1434	γ Gruis		49	-38	.064	.52	1549	ν Pegasi		21	+23	.020	.24
1435	16 Pegasi		49	+26	.018	.22	1552	κ Piscium		22	+1	.014	.19
1439	79 Draconis	21	52	+73	.023	.25	1553	θ Piscium	23	24	+6	.019	.26
1442	ϵ Indi		57	-57	.058	.80	1555	70 Pegasi		25	+12	.022	.26
1444	20 Pegasi	21	57	+13	.022	.25	1559	39 H. Cephei		28	+87	.018	.21
1449	α Aquarii	22	1	-1	.010	.13	1558	β Sculptoris		28	-38	.046	.47
1450	ι Aquarii		2	-14	.020	.22	1561	72 Pegasi		30	+31	.026	.30
1452	20 Cephei	22	2	+62	.029	.29	1567	λ Androm.	23	33	+46	.016	.20
1451	α Gruis		3	-47	...	...	1568	ι Androm.		34	+43	.021	.21
1453	ι Pegasi		3	+25	.019	.21	1569	ι Piscium		35	+5	.013	.19
1456	θ Pegasi		6	+6	.017	.22	1570	γ Cephei		36	+77	.014	.14
1457	π Pegasi		6	+33	.022	.25	1572	κ Androm.		36	+44	.020	.23
1459	ζ Cephei	22	8	+58	.018	.18	1574	ω^2 Aquarii	23	38	-15	.023	.37
1460	24 Cephei		8	+72	.021	.22	1576	i^1 Aquarii		40	-19	.022	.27
1466	θ Aquarii		12	-8	.013	.21	1577	ψ Androm.		42	+46	.023	.39
1467	α Tucanæ		13	-61	.041	.32	1580	41 H. Cephei		44	+67	.024	.27
1469	ν Octantis		15	-86	.026	.22	1581	δ Sculptoris		44	-29	.024	.33
1473	γ Aquarii	22	17	-2	.013	.18	1582	γ^1 Octantis	23	47	-83	.032	.29
1474	31 Pegasi		17	+12	.024	.28	1583	ϕ Pegasi		48	+19	.023	.31
1477	3 Lacertæ		20	+52	.018	.20	1586	ρ Cassiop.		50	+57	.032	.28
1478	π Aquarii		21	+1	.018	.30	1587	Gr. 4163		51	+74	.032	.37
1483	σ Aquarii		26	-11	.016	.21	1592	ω Piscium		55	+6	.013	.16
1488	α Lacertæ	22	28	+50	.020	.19	1593	ϵ Tucanæ	23	55	-66	.071	.60
1489	ν Aquarii		30	-21	.026	.33	1595	30 Piscium		57	-6	.022	.28
1491	226 B. Cephei		31	+76	.026	.25	1596	2 Ceti	23	59	-18	.018	.23
1490	η Aquarii	22	31	-1	.013	.19							

FOR WASHINGTON MEAN AND APPARENT NOON.



FOR WASHINGTON MEAN AND APPARENT NOON.



FOR **MEAN AND APPARENT NOON.**

FOR WASHINGTON MEAN AND APPARENT NOON.

Date.		Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Merid.	Sidereal Time of Mean Noon.
		Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
		h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
July	1	6 40 7.51	8.13	+23 7 56.8	56.2	10.346	- 9.92	+3 33.08	15 45.56	1 8.75	6 36 34.46
	2	6 44 15.69	16.34	23 3 46.7	45.9	10.335	10.93	3 44.71	15 45.65	1 8.72	6 40 31.02
	3	6 48 23.60	24.28	22 59 12.3	11.4	10.323	11.93	3 56.06	15 45.64	1 8.68	6 44 27.58
	4	6 52 31.23	31.94	22 54 13.8	12.9	10.311	12.93	4 7.12	15 45.64	1 8.64	6 48 24.14
	5	6 56 38.54	39.28	22 48 51.4	50.4	10.297	13.93	4 17.87	15 45.65	1 8.60	6 52 20.70
	6	7 0 45.50	46.27	+22 43 5.2	4.2	10.282	-14.92	+4 28.29	15 45.66	1 8.55	6 56 17.25
	7	7 4 52.10	52.90	22 36 55.3	54.2	10.267	15.90	4 38.33	15 45.68	1 8.50	7 0 13.81
	8	7 8 58.32	59.14	22 30 21.8	20.5	10.250	16.88	4 47.98	15 45.70	1 8.45	7 4 10.37
	9	7 13 4.12	4.97	22 23 25.0	23.5	10.233	17.85	4 57.22	15 45.73	1 8.39	7 8 6.93
	10	7 17 9.50	10.37	22 16 5.0	3.4	10.215	18.81	5 6.04	15 45.77	1 8.33	7 12 3.49
	11	7 21 14.44	15.33	+22 8 22.1	20.4	10.196	-19.76	+5 14.41	15 45.81	1 8.27	7 16 0.04
	12	7 25 18.91	19.82	22 0 16.4	14.6	10.177	20.71	5 22.32	15 45.85	1 8.21	7 19 56.60
	13	7 29 22.90	23.83	21 51 48.2	46.2	10.157	21.64	5 29.76	15 45.89	1 8.15	7 23 53.16
	14	7 33 26.40	27.35	21 42 57.6	55.4	10.136	22.56	5 36.71	15 45.94	1 8.08	7 27 49.72
	15	7 37 29.41	30.37	21 33 44.8	42.5	10.115	23.48	5 43.15	15 46.00	1 8.01	7 31 46.28
	16	7 41 31.91	32.89	+21 24 10.0	7.6	10.093	-24.39	+5 49.09	15 46.06	1 7.94	7 35 42.84
	17	7 45 33.89	34.88	21 14 13.4	10.9	10.071	25.30	5 54.52	15 46.12	1 7.86	7 39 39.39
	18	7 49 35.35	36.34	21 3 55.2	52.6	10.049	26.20	5 59.42	15 46.18	1 7.79	7 43 35.95
	19	7 53 36.28	37.28	20 53 15.6	13.0	10.027	27.09	6 3.79	15 46.24	1 7.71	7 47 32.51
	20	7 57 36.67	37.69	20 42 14.9	12.2	10.005	27.96	6 7.62	15 46.30	1 7.63	7 51 29.06
	21	8 1 36.52	37.55	+20 30 53.4	50.5	9.982	-28.82	+6 10.91	15 46.38	1 7.55	7 55 25.62
	22	8 5 35.81	36.85	20 19 11.2	8.1	9.959	29.68	6 13.65	15 46.46	1 7.47	7 59 22.18
	23	8 9 34.55	35.59	20 7 8.5	5.3	9.936	30.53	6 15.83	15 46.54	1 7.39	8 3 18.74
	24	8 13 32.73	33.77	19 54 45.5	42.2	9.913	31.37	6 17.45	15 46.62	1 7.30	8 7 15.30
	25	8 17 30.34	31.38	19 41 62.6	59.2	9.889	32.20	6 18.49	15 46.71	1 7.22	8 11 11.85
	26	8 21 27.38	28.42	+19 28 59.9	56.5	9.865	-33.01	+6 18.97	15 46.80	1 7.13	8 15 8.41
	27	8 25 23.84	24.88	19 15 37.8	34.3	9.841	33.82	6 18.88	15 46.90	1 7.05	8 19 4.97
	28	8 29 19.73	20.76	19 1 56.6	53.0	9.817	34.62	6 18.21	15 47.00	1 6.96	8 23 1.52
	29	8 33 15.03	16.06	18 47 56.4	52.7	9.792	35.39	6 16.95	15 47.10	1 6.88	8 26 58.08
	30	8 37 9.74	10.76	18 33 37.5	33.8	9.768	36.16	6 15.10	15 47.21	1 6.79	8 30 54.64
	31	8 41 3.86	4.87	+18 18 60.2	56.4	9.743	-36.93	+6 12.66	15 47.33	1 6.71	8 34 51.20
Aug.	1	8 44 57.38	58.38	18 4 4.8	0.9	9.718	37.68	6 9.62	15 47.45	1 6.62	8 38 47.75
	2	8 48 50.30	51.28	17 48 51.6	47.7	9.692	38.41	6 5.97	15 47.57	1 6.53	8 42 44.31
	3	8 52 42.61	43.58	17 33 21.0	17.2	9.666	39.13	6 1.72	15 47.70	1 6.44	8 46 40.86
	4	8 56 34.31	35.26	17 17 33.3	29.5	9.641	39.84	5 56.87	15 47.84	1 6.35	8 50 37.42
	5	9 0 25.39	26.33	+17 1 28.8	24.9	9.615	-40.54	+5 51.40	15 47.98	1 6.26	8 54 33.98
	6	9 4 15.86	16.78	16 45 7.8	3.9	9.590	41.21	5 45.31	15 48.13	1 6.17	8 58 30.54
	7	9 8 5.72	6.62	16 28 30.7	26.7	9.565	41.88	5 38.61	15 48.28	1 6.09	9 2 27.09
	8	9 11 54.97	55.85	16 11 37.7	33.7	9.540	42.54	5 31.30	15 48.43	1 6.00	9 6 23.65
	9	9 15 43.62	44.48	15 54 29.1	25.2	9.515	43.17	5 23.39	15 48.58	1 5.92	9 10 20.20
	10	9 19 31.67	32.50	+15 37 5.3	1.5	9.490	-43.80	+5 14.88	15 48.75	1 5.84	9 14 16.76
	11	9 23 19.12	19.92	15 19 26.6	22.8	9.465	44.42	5 5.77	15 48.92	1 5.76	9 18 13.32
	12	9 27 5.99	6.76	15 1 33.3	29.6	9.441	45.02	4 56.09	15 49.09	1 5.68	9 22 9.87
	13	9 30 52.30	53.04	14 43 25.7	22.1	9.418	45.60	4 45.84	15 49.26	1 5.60	9 26 6.43
	14	9 34 38.05	38.76	14 25 4.1	0.6	9.395	46.18	4 35.02	15 49.44	1 5.52	9 30 2.98
	15	9 38 23.25	23.93	+14 6 28.8	25.4	9.372	-46.75	+4 23.66	15 49.62	1 5.44	9 33 59.54
	16	9 42 7.91	8.56	+13 47 40.1	36.8	9.350	-47.31	+4 11.77	15 49.80	1 5.36	9 37 56.10

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0^s.19 from the sidereal interval.

FOR

MEAN AND APPARENT NOON.

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MEAN AND APPARENT NOON.

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NOTE.—For mean time interval of semidiameter passing meridian, subtract 0^s.18 from the sidereal interval.

{Eph 13}

FOR WASHINGTON MEAN AND**NOON.**

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0^s.19 from the sidereal interval.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax.	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Feb. 15	U	7 20.75	2.488	5 2 20.59	159.53	+27 47 49.6	+ 266.8	75.07	15 53.8	58 14.6	I. S.
15	L	19 51.14	2.573	5 34 47.17	164.65	28 27 27.0	+ 127.1	76.29	16 2.0	58 44.6	I. N.S.
16	U	8 22.41	2.634	6 8 6.68	168.30	28 37 51.7	- 24.7	77.13	16 10.1	59 14.3	I. N.
16	L	20 54.23	2.664	6 41 59.44	170.16	28 17 3.4	184.2	77.53	16 17.9	59 43.0	I. N.
17	U	9 26.23	2.663	7 16 2.84	170.07	+27 24 4.5	- 345.4	77.47	16 25.2	60 9.9	I. N.
17	L	21 58.03	2.632	7 49 54.24	168.20	25 59 12.0	502.1	76.99	16 31.8	60 33.9	I. N.
18	U	10 29.30	2.576	8 23 13.84	164.84	24 3 56.9	648.1	76.16	16 37.4	60 54.5	I. N.
18	L	22 59.79	2.504	8 55 46.76	160.50	21 40 58.3	778.7	75.08	16 41.8	61 10.8	I. N.
19	U	11 29.36	2.423	9 27 24.03	155.66	+18 53 46.3	- 889.8	73.87	16 44.9	61 22.2	I. N.
19	L	23 57.95	2.342	9 58 2.53	150.76	15 46 27.0	979.6	72.65	16 46.5	61 28.0	I. N.
20	U	12 25.60	2.267	10 27 44.12	146.22	12 23 24.4	1047.1	71.50	16 46.6	61 28.4	II.N.S.
21	L	0 52.39	2.201	10 56 34.37	142.26	8 49 7.4	1092.0	70.49	16 45.1	61 23.2	II.N.S.
21	U	13 18.47	2.147	11 24 41.42	139.05	+ 5 7 59.3	-1115.7	69.67	16 42.2	61 12.5	II. S.
22	L	1 43.98	2.108	11 52 14.87	136.66	+ 1 24 10.4	1119.1	69.07	16 37.9	60 56.8	II. S.
22	U	14 9.11	2.083	12 19 24.95	135.16	- 2 18 25.6	1104.0	68.70	16 32.4	60 36.7	II. S.
23	L	2 34.02	2.071	12 46 21.90	134.50	5 56 14.9	1071.6	68.56	16 26.0	60 13.1	II. S.
23	U	14 58.88	2.073	13 13 15.58	134.61	- 9 26 3.2	-1023.9	68.62	16 18.8	59 46.6	II. S.
24	L	3 23.82	2.086	13 40 14.84	135.39	12 44 54.6	962.3	68.87	16 11.0	59 18.0	II. S.
24	U	15 48.99	2.109	14 7 27.32	136.77	15 50 11.6	888.4	69.26	16 2.9	58 48.2	II. S.
25	L	4 14.48	2.139	14 34 59.05	138.57	18 39 33.1	803.4	69.77	15 54.7	58 18.1	II. S.
25	U	16 40.35	2.173	15 2 53.91	140.59	-21 10 53.5	- 708.5	70.32	15 46.5	57 48.0	II. S.
26	L	5 6.64	2.207	15 31 13.45	142.64	23 22 23.9	605.3	70.86	15 38.5	57 18.7	II. S.
26	U	17 33.31	2.238	15 59 56.49	144.48	25 12 32.1	495.1	71.35	15 30.9	56 50.7	II. S.
27	L	6 0.31	2.261	16 28 59.08	145.86	26 40 5.5	379.7	71.70	15 23.7	56 24.3	II. S.
27	U	18 27.52	2.273	16 58 14.61	146.60	-27 44 13.4	- 261.2	71.88	15 17.0	56 0.0	II. S.
28	L	6 54.80	2.272	17 27 34.26	146.53	28 24 30.4	141.6	71.86	15 11.0	55 37.6	II. S.
28	U	19 21.98	2.256	17 56 47.84	145.57	28 40 56.6	- 23.2	71.60	15 5.6	55 17.6	II.N.
Mar. 1	L	7 48.88	2.225	18 25 44.68	143.75	28 33 59.5	+ 91.9	71.11	15 0.8	54 59.9	II.N.
1	U	20 15.34	2.182	18 54 14.75	141.14	-28 4 31.1	+ 201.8	70.40	14 56.6	54 44.6	II.N.
2	L	8 41.21	2.128	19 22 9.47	137.89	27 13 44.2	304.7	69.52	14 53.0	54 31.6	II.N.
2	U	21 6.39	2.067	19 49 22.35	134.20	26 3 8.8	399.8	68.51	14 50.1	54 20.8	II.N.
3	L	9 30.80	2.001	20 15 49.32	130.27	24 34 24.4	486.1	67.43	14 47.7	54 12.1	II.N.
3	U	21 54.42	1.935	20 41 28.77	126.31	-22 49 17.8	+ 563.4	66.32	14 45.9	54 5.4	II.N.
4	L	10 17.26	1.872	21 6 21.27	122.48	20 49 37.5	631.8	65.24	14 44.6	54 0.5	II.N.
4	U	22 39.36	1.813	21 30 29.27	118.91	18 37 10.8	691.3	64.22	14 43.7	53 57.5	II.N.
5	L	11 0.79	1.760	21 53 56.73	115.73	16 13 41.8	742.2	63.30	14 43.4	53 56.2	
5	U	23 21.63	1.715	22 16 48.75	113.01	-13 40 50.0	+ 785.1	62.52	14 43.5	53 56.5	
6	L	11 41.98	1.678	22 39 11.27	110.83	11 0 11.2	820.1	61.88	14 43.9	53 58.2	
7	U	0 1.94	1.651	23 1 10.82	109.19	8 13 16.9	847.7	61.40	14 44.7	54 1.2	
7	L	12 21.64	1.634	23 22 54.38	108.16	5 21 35.3	868.0	61.10	14 45.9	54 5.5	
8	U	0 41.20	1.627	23 44 29.26	107.76	- 2 26 32.3	+ 881.3	60.99	14 47.4	54 11.1	
8	L	13 0.74	1.631	0 6 3.03	107.98	+ 0 30 26.6	887.3	61.07	14 49.3	54 18.0	I. S.
9	U	1 20.39	1.646	0 27 43.50	108.88	3 27 55.5	886.2	61.35	14 51.6	54 26.2	I. S.
9	L	13 40.28	1.672	0 49 38.69	110.43	6 24 26.3	877.6	61.83	14 54.1	54 35.6	I. S.
10	U	2 0.56	1.709	1 11 56.82	112.70	+ 9 18 26.7	+ 861.0	62.50	14 57.1	54 46.4	I. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

1

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON

Date.	Culmination.	Mean Time of Transit.		Diff. for 1 Hour of Long.	Right Ascension of Center.			Diff. for 1 Hour of Long.	Geocentric Declination of Center.			Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.		Equatorial Horizontal Parallax.		Bright Limbs.	
		h	m	m	h	m	s	s	°	'	"	"	s	'	"	'	"		
July 1	L	10	3.16	2.438	4	41	23.40	156.54	+27	7	12.6	+ 332.0	74.03	15	47.1	57	50.2	II.	S.
1	U	22	32.95	2.523	5	13	13.86	161.66	28	0	36.4	199.6	75.25	15	53.7	58	14.3	II.	S.
2	L	11	3.62	2.585	5	45	57.45	165.35	28	26	14.9	+ 55.0	76.12	15	59.9	58	37.2	II.	S.
2	U	23	34.86	2.616	6	19	15.12	167.25	28	22	5.2	- 97.3	76.56	16	5.7	58	58.3		
3	L	12	6.29	2.616	6	52	44.00	167.23	+27	47	6.7	- 252.1	76.55	16	10.8	59	17.0		
4	U	0	37.52	2.585	7	26	1.27	165.36	26	41	29.6	402.8	76.11	16	15.2	59	33.0		
4	L	13	8.22	2.528	7	58	46.46	161.95	25	6	34.9	544.2	75.30	16	18.7	59	46.1	I.	S.
5	U	1	38.12	2.454	8	30	43.82	157.44	23	4	45.7	671.4	74.22	16	21.3	59	55.7	I.	N.
5	L	14	7.06	2.370	9	1	43.47	152.42	+20	39	9.9	- 781.6	73.00	16	23.0	60	1.9	I.	N.
6	U	2	34.98	2.285	9	31	41.46	147.26	17	53	23.9	873.0	71.74	16	23.8	60	4.6	I.	N.
6	L	15	1.89	2.204	10	0	38.99	142.39	14	51	15.5	945.2	70.53	16	23.6	60	4.0	I.	N.
7	U	3	27.89	2.132	10	28	41.26	138.10	11	36	31.5	999.0	69.45	16	22.7	60	0.5	I.	N.
7	L	15	53.10	2.072	10	55	56.18	134.53	+ 8	12	50.1	-1035.0	68.54	16	20.9	59	54.1	I.	N.
8	U	4	17.68	2.028	11	22	33.54	131.84	4	43	37.1	1054.5	67.85	16	18.5	59	45.3	I.	N.
8	L	16	41.82	1.998	11	48	44.06	130.07	+ 1	12	3.1	1058.6	67.40	16	15.6	59	34.5	I.	N.
9	U	5	5.70	1.984	12	14	38.82	129.21	- 2	18	53.7	1048.4	67.19	16	12.1	59	21.9	I.	N.
9	L	17	29.49	1.985	12	40	28.88	129.27	- 5	46	26.2	-1024.7	67.21	16	8.3	59	8.0	I.	N.
10	U	5	53.39	2.000	13	6	24.90	130.20	9	7	56.7	988.1	67.47	16	4.3	58	53.2	I.	N.
10	L	18	17.55	2.029	13	32	36.84	131.92	12	20	52.2	939.0	67.93	16	0.1	58	37.6	I.	N.
11	U	6	42.12	2.069	13	59	13.53	134.31	15	22	44.0	877.5	68.55	15	55.7	58	21.6	I.	N.
11	L	19	7.23	2.117	14	26	22.26	137.23	-18	11	5.3	- 803.9	69.30	15	51.3	58	5.3	I.	N.
12	U	7	32.96	2.171	14	54	8.29	140.49	20	43	31.8	718.5	70.12	15	46.8	57	48.9	I.	N.
12	L	19	59.34	2.227	15	22	34.21	143.82	22	57	43.9	621.6	70.95	15	42.3	57	32.4	I.	N.
13	U	8	26.38	2.279	15	51	39.36	146.97	24	51	29.9	514.4	71.72	15	37.8	57	16.0	I.	N.
13	L	20	54.00	2.323	16	21	19.42	149.59	-26	22	53.2	- 398.2	72.35	15	33.4	56	59.8	I.	N.
14	U	9	22.07	2.353	16	51	26.37	151.40	27	30	19.7	275.3	72.77	15	29.1	56	43.9	I.	N.S.
14	L	21	50.40	2.365	17	21	48.77	152.13	28	12	44.7	148.6	72.92	15	24.8	56	28.1	I.	S.
15	U	10	18.75	2.357	17	52	12.83	151.66	28	29	40.3	- 21.0	72.77	15	20.6	56	12.7	I.	S.
15	L	22	46.88	2.328	18	22	23.67	149.94	-28	21	18.8	+ 103.8	72.32	15	16.5	55	57.6	I.	S.
16	U	11	14.55	2.281	18	52	6.93	147.10	27	48	32.1	222.8	71.59	15	12.5	55	42.9	I.	S.
16	L	23	41.56	2.218	19	21	10.23	143.34	26	52	45.7	333.4	70.61	15	8.6	55	28.8	I.	S.
17	U	12	7.75	2.145	19	49	24.16	138.92	25	35	53.0	433.6	69.47	15	4.9	55	15.3	I.II.	S.
18	L	0	33.02	2.066	20	16	42.81	134.16	-24	0	4.0	+ 522.6	68.23	15	1.5	55	2.6	II.	S.
18	U	12	57.33	1.986	20	43	3.65	129.34	22	7	36.9	600.0	66.96	14	58.2	54	50.7	II.N.S.	
19	L	1	20.69	1.908	21	8	27.31	124.66	20	0	51.0	665.9	65.72	14	55.3	54	39.9	II.N.S.	
19	U	13	43.15	1.836	21	32	56.86	120.34	17	42	0.0	720.9	64.56	14	52.7	54	30.4	II.N.	
20	L	2	4.80	1.772	21	56	37.28	116.50	-15	13	9.3	+ 766.0	63.51	14	50.5	54	22.2	II.N.	
20	U	14	25.73	1.718	22	19	34.89	113.22	12	36	13.7	801.8	62.62	14	48.7	54	15.6	II.N.	
21	L	2	46.07	1.674	22	41	56.92	110.57	9	52	56.9	829.6	61.90	14	47.4	54	10.8	II.N.	
21	U	15	5.95	1.641	23	3	51.19	108.59	7	4	52.7	849.8	61.36	14	46.6	54	7.9	II.N.	
22	L	3	25.50	1.620	23	25	25.88	107.30	- 4	13	26.7	+ 863.4	61.01	14	46.3	54	7.0	II.N.	
22	U	15	44.87	1.611	23	46	49.52	106.75	- 1	19	57.4	870.4	60.88	14	46.7	54	8.3	II.N.	
23	L	4	4.20	1.613	0	8	10.75	106.93	+ 1	34	20.6	871.4	60.96	14	47.7	54	12.0	II.N.	
23	U	16	23.64	1.628	0	29	38.44	107.83	4	28	14.6	866.5	61.25	14	49.3	54	18.0	II.N.	
24	L	4	43.33	1.656	0	51	21.69	109.52	+ 7	20	30.4	+ 855.2	61.76	14	51.7	54	26.7	II.N.	

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

	Bright Limbs.
.7	I.H. S
.0	II.N.S.
.7	II.N.S.
.7	II.N.
.2	II.N.
.1	II.N.
.8	II.N.
.3	II.N.
.7	II.N.
.1	II.N.
.7	II.N.
.5	II.N.
.7	II.N.
.3	II.N.
.2	II.N.
.5	II.N.
.1	II.N.
.8	II.N.
.4	II.N.
.5	II.N.
.8	II. S
.7	II. S
.5	II. S
.6	II. S
.1	II. S
.3	II. S
.4	II. S
.5	II. S
.2	
.9	
.2	
.3	
.0	I. N.
.9	I. N.
.4	I. N.
.2	I. N.
.9	I. N.
.5	I. N.
.4	I. N.
.4	I. N.
.4	I. N.
.7	I. N.
.9	I. N.
.5	I. N.
.3	I. N.S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

1

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

Date.	Culmination.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Center.	Diff. for 1 Hour of Long.	Geocentric Declination of Center.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semidiameter.	Equatorial Horizontal Parallax	Bright Limbs.
		h m	m	h m s	s	° ' "	"	s	' "	' "	
Sept. 30	L	12 40.45	2.196	13 17 52.85	141.99	-10 54 16.2	-1052.9	70.45	16 38.3	60 57.8	
Oct. 1	U	1 7.04	2.237	13 46 31.19	144.48	14 18 28.7	986.1	71.10	16 33.6	60 40.6	I. N.
1	L	13 34.17	2.285	14 15 41.86	147.35	17 27 32.3	901.6	71.85	16 27.7	60 19.3	I. N.
2	U	2 1.90	2.335	14 45 28.20	150.37	20 18 3.4	801.0	72.64	16 21.0	59 54.6	I. N.
2	L	14 30.22	2.383	15 15 50.25	153.24	-22 47 0.6	-686.4	73.40	16 13.6	59 27.5	I. N.
3	U	2 59.07	2.423	15 46 44.26	155.64	24 51 51.3	560.4	74.03	16 5.8	58 58.7	I. N.
3	L	15 28.32	2.450	16 18 2.59	157.25	26 30 38.3	426.3	74.47	15 57.7	58 28.8	I. N.
4	U	3 57.79	2.459	16 49 33.94	157.78	27 42 6.4	287.9	74.62	15 49.5	57 58.7	I. N.
4	L	16 27.25	2.447	17 21 4.41	157.08	-28 25 45.9	-148.9	74.48	15 41.4	57 29.1	I. N.
5	U	4 56.44	2.414	17 52 18.82	155.11	28 41 53.8	-13.3	74.01	15 33.6	57 0.6	I. N.
5	L	17 25.12	2.361	18 23 2.45	151.97	28 31 29.9	+115.9	73.24	15 26.2	56 33.4	I. S.
6	U	5 53.07	2.293	18 53 2.47	147.88	27 56 8.9	235.9	72.21	15 19.3	56 8.1	I. S.
6	L	18 20.14	2.215	19 22 9.19	143.13	-26 57 51.4	+345.2	71.01	15 13.0	55 44.9	I. S.
7	U	6 46.21	2.131	19 50 16.48	138.04	25 38 53.2	442.6	69.67	15 7.3	55 24.0	I. S.
7	L	19 11.26	2.044	20 17 21.76	132.86	24 1 35.5	528.4	68.29	15 2.3	55 5.6	I. S.
8	U	7 35.29	1.961	20 43 25.65	127.83	22 8 17.8	602.7	66.92	14 57.9	54 49.5	I. S.
8	L	19 58.35	1.883	21 8 31.26	123.17	-20 1 13.2	+666.3	65.62	14 54.2	54 35.9	I. S.
9	U	8 20.52	1.813	21 32 43.61	118.98	17 42 25.0	720.1	64.42	14 51.1	54 24.7	I. S.
9	L	20 41.92	1.753	21 56 8.98	115.36	15 13 46.2	764.9	63.37	14 48.7	54 15.7	I. S.
10	U	9 2.65	1.703	22 18 54.48	112.34	12 37 0.3	801.5	62.48	14 46.9	54 9.0	I. S.
10	L	21 22.84	1.664	22 41 7.70	109.97	-9 53 42.5	+830.3	61.76	14 45.6	54 4.3	I. S.
11	U	9 42.63	1.635	23 2 56.47	108.28	7 5 21.0	852.0	61.24	14 44.9	54 1.6	I. S.
11	L	22 2.14	1.618	23 24 28.68	107.21	4 13 19.8	867.0	60.90	14 44.6	54 0.7	I. S.
12	U	10 21.51	1.612	23 45 52.26	106.83	-1 18 59.8	875.2	60.75	14 44.8	54 1.4	I. S.
12	L	22 40.86	1.616	0 7 15.14	107.10	+1 36 17.8	+876.6	60.81	14 45.5	54 3.8	I. S.
13	U	11 0.34	1.632	0 28 45.20	108.02	4 31 11.6	871.2	61.06	14 46.5	54 7.6	I. S.
13	L	23 20.07	1.658	0 50 30.29	109.60	7 24 16.0	858.3	61.51	14 47.9	54 12.7	I. N.S.
14	U	11 40.17	1.695	1 12 38.10	111.81	10 14 1.1	837.8	62.14	14 49.6	54 19.1	I. N.S.
15	L	0 0.78	1.742	1 35 16.27	114.65	+12 58 50.6	+808.9	62.95	14 51.7	54 26.7	II. N.
15	U	12 22.01	1.799	1 58 32.06	118.07	15 37 0.2	771.1	63.92	14 54.1	54 35.4	II. N.
16	L	0 43.98	1.865	2 22 32.24	122.04	18 6 37.2	723.4	65.03	14 56.7	54 45.2	II. N.
16	U	13 6.79	1.938	2 47 22.72	126.44	20 25 40.1	665.3	66.25	14 59.7	54 56.0	II. N.
17	L	1 30.51	2.016	3 13 8.14	131.17	+22 31 58.4	+595.8	67.55	15 3.0	55 8.1	II. N.
17	U	13 55.19	2.097	3 39 51.30	136.04	24 23 15.2	514.9	68.87	15 6.6	55 21.4	II. N.
18	L	2 20.84	2.177	4 7 32.65	140.82	25 57 10.3	422.2	70.15	15 10.5	55 35.7	II. N.
18	U	14 47.41	2.251	4 36 9.60	145.25	27 11 25.1	318.3	71.32	15 14.7	55 51.3	II. N.
19	L	3 14.81	2.314	5 5 36.39	149.07	+28 3 49.4	+204.1	72.33	15 19.3	56 8.0	II. N.
19	U	15 42.89	2.363	5 35 43.83	152.00	28 32 30.4	+81.4	73.10	15 24.2	56 26.0	II. N.
20	L	4 11.44	2.393	6 6 20.02	153.84	28 35 59.8	-47.3	73.59	15 29.4	56 45.1	II. N.
20	U	16 40.24	2.404	6 37 11.13	154.48	28 13 22.7	179.1	73.77	15 34.9	57 5.3	II. N.S.
21	L	5 9.06	2.395	7 8 2.91	153.95	+27 24 21.2	-310.9	73.66	15 40.7	57 26.6	II. S.
21	U	17 37.66	2.370	7 38 42.18	152.42	26 9 16.7	439.1	73.29	15 46.7	57 48.7	II. S.
22	L	6 5.88	2.331	8 8 58.06	150.11	24 29 6.0	561.3	72.72	15 52.9	58 11.3	II. S.
22	U	18 33.58	2.285	8 38 42.98	147.31	22 25 19.4	674.9	72.00	15 59.1	58 34.2	II. S.
23	L	7 0.70	2.235	9 7 52.93	144.34	+19 59 51.7	-777.9	71.23	16 5.3	58 57.0	II. S.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

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AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

AT TRANSIT OF MOON'S CENTER OVER THE MERIDIAN OF WASHINGTON.

MERCURY, 1913.
FOR TRANSIT AT WASHINGTON.



FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem- Pass. Mer.	Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem- Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
July 1	1 52	8 28 51.57	+19 53 58.8	9.5	3.6	0.25	Aug. 15	22 57	8 34 29.50	+16 18 50.6	11.5	4.4	0.30
2	1 53	8 33 41.31	19 27 6.7	9.6	3.6	0.26	16	22 54	8 36 1.23	16 31 12.6	11.2	4.2	0.29
3	1 54	8 38 17.72	19 0 0.3	9.8	3.7	0.26	17	22 52	8 38 3.26	16 41 39.3	10.8	4.1	0.29
4	1 54	8 42 40.66	18 32 45.7	10.0	3.8	0.27	18	22 51	8 40 35.43	16 49 59.2	10.5	4.0	0.28
5	1 54	8 46 49.98	18 5 28.9	10.2	3.9	0.27	19	22 50	8 43 37.30	16 56 1.5	10.2	3.9	0.27
6	1 54	8 50 45.48	+17 38 15.7	10.4	3.9	0.28	20	22 50	8 47 8.14	+16 59 36.3	9.9	3.8	0.26
7	1 54	8 54 26.92	17 11 12.0	10.5	4.0	0.28	21	22 50	8 51 6.99	17 0 34.6	9.6	3.6	0.25
8	1 53	8 57 54.07	16 44 23.9	10.7	4.1	0.28	22	22 50	8 55 32.66	16 58 48.4	9.3	3.5	0.25
9	1 53	9 1 6.63	16 17 57.6	10.9	4.1	0.29	23	22 51	9 0 23.73	16 54 10.9	9.1	3.4	0.24
10	1 52	9 4 4.30	15 51 59.5	11.1	4.2	0.29	24	22 52	9 5 38.54	16 46 36.8	8.8	3.3	0.23
11	1 50	9 6 46.75	+15 26 36.0	11.4	4.3	0.30	25	22 54	9 11 15.26	+16 36 2.4	8.6	3.3	0.23
12	1 49	9 9 13.62	15 1 53.5	11.6	4.4	0.30	26	22 56	9 17 11.91	16 22 25.8	8.4	3.2	0.22
13	1 47	9 11 24.53	14 37 58.7	11.8	4.5	0.31	27	22 58	9 23 26.38	16 5 47.2	8.2	3.1	0.21
14	1 45	9 13 19.11	14 14 58.6	12.0	4.6	0.31	28	23 1	9 29 56.45	15 46 8.7	8.0	3.0	0.21
15	1 43	9 14 56.94	13 53 0.1	12.2	4.6	0.32	29	23 4	9 36 39.89	15 23 34.3	7.8	2.9	0.20
16	1 40	9 16 17.63	+13 32 10.3	12.4	4.7	0.32	30	23 7	9 43 34.47	+14 58 10.1	7.6	2.9	0.20
17	1 37	9 17 20.81	13 12 36.4	12.6	4.8	0.33	31	23 10	9 50 38.01	14 30 4.0	7.5	2.8	0.20
18	1 34	9 18 6.14	12 54 25.9	12.9	4.9	0.33	Sept. 1	23 13	9 57 48.45	13 59 25.1	7.3	2.8	0.19
19	1 31	9 18 33.29	12 37 46.0	13.1	5.0	0.34	2	23 16	10 5 3.84	13 26 23.7	7.2	2.7	0.19
20	1 27	9 18 42.02	12 22 44.0	13.3	5.0	0.34	3	23 20	10 12 22.41	12 51 11.2	7.1	2.7	0.19
21	1 23	9 18 32.16	+12 9 27.1	13.5	5.1	0.35	4	23 23	10 19 42.59	+12 13 59.4	7.0	2.6	0.18
22	1 18	9 18 3.67	11 58 2.2	13.7	5.2	0.35	5	23 26	10 27 3.01	11 35 0.2	6.9	2.6	0.18
23	1 14	9 17 16.63	11 48 35.6	13.9	5.3	0.36	6	23 30	10 34 22.47	10 54 25.4	6.8	2.6	0.18
24	1 9	9 16 11.30	11 41 13.0	14.1	5.3	0.36	7	23 33	10 41 39.99	10 12 26.7	6.7	2.5	0.17
25	1 4	9 14 48.13	11 35 59.7	14.3	5.4	0.37	8	23 36	10 48 54.76	9 29 15.3	6.7	2.5	0.17
26	0 58	9 13 7.81	+11 32 59.6	14.4	5.5	0.37	9	23 40	10 56 6.14	+ 8 45 1.6	6.6	2.5	0.17
27	0 52	9 11 11.29	11 32 15.5	14.6	5.5	0.38	10	23 43	11 3 13.64	7 59 55.5	6.5	2.5	0.17
28	0 46	9 8 59.81	11 33 48.8	14.7	5.6	0.38	11	23 46	11 10 16.90	7 14 6.2	6.5	2.4	0.17
29	0 40	9 6 34.90	11 37 38.9	14.8	5.6	0.38	12	23 49	11 17 15.69	6 27 42.0	6.4	2.4	0.16
30	0 33	9 3 58.41	11 43 43.6	14.8	5.6	0.38	13	23 52	11 24 9.85	5 40 50.6	6.4	2.4	0.16
31	0 26	9 1 12.51	+11 51 58.8	14.8	5.6	0.38	14	23 55	11 30 59.30	+ 4 53 39.0	6.4	2.4	0.16
Aug. 1	0 20	8 58 19.66	12 2 18.2	14.8	5.6	0.38	15	23 58	11 37 44.05	4 6 13.3	6.4	2.4	0.16
2	0 13	8 55 22.59	12 14 33.4	14.8	5.6	0.38	17	0 0	11 44 24.16	3 18 39.3	6.3	2.4	0.16
3	0 6	8 52 24.24	12 28 34.0	14.7	5.6	0.38	18	0 3	11 50 59.71	2 31 2.0	6.3	2.4	0.16
3	23 59	8 49 27.73	12 44 8.0	14.6	5.5	0.38	19	0 6	11 57 30.83	1 43 26.1	6.3	2.4	0.16
4	23 52	8 46 36.31	+13 1 1.7	14.5	5.5	0.38	20	0 8	12 3 57.66	+ 0 55 55.8	6.3	2.4	0.16
5	23 45	8 43 53.23	13 19 0.2	14.3	5.4	0.37	21	0 10	12 10 20.39	+ 0 8 34.6	6.3	2.4	0.16
6	23 39	8 41 21.69	13 37 47.5	14.1	5.4	0.37	22	0 13	12 16 39.20	- 0 38 34.2	6.3	2.4	0.16
7	23 33	8 39 4.80	13 57 7.3	13.9	5.3	0.36	23	0 15	12 22 54.28	1 25 27.6	6.3	2.4	0.16
8	23 27	8 37 5.49	14 16 43.0	13.7	5.2	0.36	24	0 17	12 29 5.82	2 12 2.7	6.3	2.4	0.16
9	23 21	8 35 26.45	+14 36 18.0	13.4	5.1	0.35	25	0 20	12 35 14.02	- 2 58 17.1	6.3	2.4	0.16
10	23 16	8 34 10.07	14 55 35.8	13.1	5.0	0.34	26	0 22	12 41 19.09	3 44 8.4	6.3	2.4	0.16
11	23 11	8 33 18.44	15 14 20.4	12.8	4.8	0.34	27	0 24	12 47 21.21	4 29 34.7	6.3	2.4	0.16
12	23 7	8 32 53.32	15 32 16.6	12.5	4.7	0.33	28	0 26	12 53 20.56	5 14 34.1	6.3	2.4	0.16
13	23 3	8 32 56.13	15 49 9.5	12.2	4.6	0.32	29	0 28	12 59 17.33	5 59 4.8	6.3	2.4	0.16
14	23 0	8 33 27.94	+16 4 45.3	11.8	4.5	0.31	30	0 30	13 5 11.71	- 6 43 5.1	6.3	2.4	0.16
15	22 57	8 34 29.50	+16 18 50.6	11.5	4.4	0.30	Oct. 1	0 32	13 11 3.86	- 7 26 33.4	6.3	2.4	0.16

MERCURY, 1913.
FOR TRANSIT AT WASHINGTON.

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FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	3 2	21 41 55.42	-15 41 1.4	8.8	8.5	0.59	Feb. 15	3 5	0 46 3.62	+ 6 47 28.0	13.1	12.7	0.85
1	3 3	21 46 28.70	15 15 39.9	8.8	8.6	0.59	16	3 5	0 49 31.29	7 16 25.8	13.2	12.9	0.86
2	3 4	21 51 0.34	14 49 56.3	8.9	8.6	0.60	17	3 4	0 52 57.36	7 45 11.2	13.4	13.0	0.88
3	3 4	21 55 30.36	14 23 51.4	9.0	8.7	0.60	18	3 4	0 56 21.77	8 13 43.2	13.5	13.2	0.89
4	3 5	21 59 58.76	13 57 26.1	9.0	8.8	0.60	19	3 3	0 59 44.48	8 42 1.1	13.7	13.3	0.90
5	3 5	22 4 25.55	-13 30 41.1	9.1	8.8	0.60	20	3 2	1 3 5.43	+ 9 10 4.4	13.9	13.5	0.91
6	3 6	22 8 50.75	13 3 37.3	9.1	8.9	0.61	21	3 2	1 6 24.58	9 37 52.4	14.0	13.6	0.92
7	3 6	22 13 14.37	12 36 15.4	9.2	8.9	0.61	22	3 1	1 9 41.86	10 5 24.4	14.2	13.8	0.94
8	3 6	22 17 36.41	12 8 36.2	9.3	9.0	0.61	23	3 0	1 12 57.21	10 32 39.7	14.4	14.0	0.95
9	3 7	22 21 56.90	11 40 40.7	9.3	9.1	0.62	24	3 0	1 16 10.57	10 59 37.6	14.6	14.1	0.96
10	3 7	22 26 15.84	-11 12 29.5	9.4	9.1	0.62	25	2 59	1 19 21.87	+11 26 17.5	14.7	14.3	0.98
11	3 8	22 30 33.26	10 44 3.4	9.5	9.2	0.63	26	2 58	1 22 31.04	11 52 38.6	14.9	14.5	0.99
12	3 8	22 34 49.15	10 15 23.4	9.5	9.3	0.63	27	2 58	1 25 37.98	12 18 40.3	15.1	14.7	1.00
13	3 8	22 39 3.52	9 46 30.3	9.6	9.3	0.63	28	2 57	1 28 42.61	12 44 22.0	15.3	14.9	1.02
14	3 9	22 43 16.38	9 17 24.8	9.7	9.4	0.64	Mar. 1	2 56	1 31 44.84	13 9 43.0	15.5	15.1	1.03
15	3 9	22 47 27.76	- 8 48 7.6	9.8	9.5	0.64	2	2 55	1 34 44.55	+13 34 42.5	15.7	15.3	1.05
16	3 9	22 51 37.66	8 18 39.7	9.9	9.6	0.65	3	2 54	1 37 41.64	13 59 19.7	15.9	15.5	1.06
17	3 9	22 55 46.10	7 49 1.9	9.9	9.6	0.65	4	2 53	1 40 35.99	14 23 33.8	16.1	15.7	1.08
18	3 9	22 59 53.09	7 19 14.9	10.0	9.7	0.66	5	2 52	1 43 27.46	14 47 24.1	16.4	15.9	1.10
19	3 10	23 3 58.64	6 49 19.4	10.1	9.8	0.66	6	2 50	1 46 15.94	15 10 49.8	16.6	16.1	1.11
20	3 10	23 8 2.78	- 6 19 16.3	10.2	9.9	0.66	7	2 49	1 49 1.28	+15 33 50.0	16.8	16.3	1.13
21	3 10	23 12 5.52	5 49 6.3	10.3	10.0	0.67	8	2 48	1 51 43.30	15 56 23.8	17.1	16.6	1.15
22	3 10	23 16 6.86	5 18 50.3	10.4	10.1	0.67	9	2 47	1 54 21.85	16 18 30.4	17.3	16.8	1.17
23	3 10	23 20 6.82	4 48 28.9	10.4	10.1	0.68	10	2 45	1 56 56.75	16 40 8.9	17.6	17.1	1.18
24	3 10	23 24 5.43	4 18 2.9	10.5	10.2	0.68	11	2 44	1 59 27.84	17 1 18.4	17.8	17.3	1.20
25	3 10	23 28 2.69	- 3 47 32.8	10.6	10.3	0.69	12	2 42	2 1 54.93	+17 21 57.8	18.1	17.5	1.22
26	3 10	23 31 58.62	3 16 59.4	10.7	10.4	0.70	13	2 41	2 4 17.81	17 42 6.0	18.3	17.8	1.24
27	3 10	23 35 53.23	2 46 23.5	10.8	10.5	0.70	14	2 39	2 6 36.27	18 1 42.0	18.6	18.1	1.26
28	3 10	23 39 46.54	2 15 45.8	10.9	10.6	0.71	15	2 38	2 8 50.09	18 20 44.6	18.9	18.3	1.29
29	3 10	23 43 38.57	1 45 6.8	11.0	10.7	0.71	16	2 36	2 10 59.07	18 39 12.8	19.2	18.6	1.31
30	3 10	23 47 29.32	- 1 14 27.3	11.1	10.8	0.72	17	2 34	2 13 2.96	+18 57 5.3	19.4	18.9	1.33
31	3 10	23 51 18.80	0 43 48.0	11.2	10.9	0.73	18	2 32	2 15 1.51	19 14 20.9	19.7	19.2	1.35
Feb. 1	3 10	23 55 7.00	- 0 13 9.7	11.3	11.0	0.73	19	2 30	2 16 54.48	19 30 58.3	20.1	19.5	1.38
2	3 9	23 58 53.92	+ 0 17 27.0	11.4	11.1	0.74	20	2 28	2 18 41.63	19 46 56.2	20.4	19.8	1.40
3	3 9	0 2 39.56	0 48 1.4	11.6	11.2	0.75	21	2 26	2 20 22.71	20 2 13.1	20.7	20.1	1.42
4	3 9	0 6 23.92	+ 1 18 32.7	11.7	11.3	0.76	22	2 23	2 21 57.47	+20 16 47.5	21.0	20.4	1.45
5	3 9	0 10 7.00	1 49 0.2	11.8	11.4	0.76	23	2 21	2 23 25.67	20 30 38.0	21.4	20.7	1.47
6	3 8	0 13 48.79	2 19 23.3	11.9	11.5	0.77	24	2 18	2 24 47.05	20 43 43.0	21.7	21.1	1.50
7	3 8	0 17 29.28	2 49 41.2	12.0	11.7	0.78	25	2 15	2 26 1.35	20 56 0.7	22.0	21.4	1.53
8	3 8	0 21 8.44	3 19 53.1	12.2	11.8	0.79	26	2 13	2 27 8.34	21 7 29.7	22.4	21.7	1.55
9	3 8	0 24 46.26	+ 3 49 58.2	12.3	11.9	0.80	27	2 10	2 28 7.78	+21 18 8.2	22.7	22.1	1.58
10	3 7	0 28 22.72	4 19 55.9	12.4	12.0	0.81	28	2 7	2 28 59.41	21 27 54.2	23.1	22.4	1.61
11	3 7	0 31 57.79	4 49 45.6	12.5	12.2	0.82	29	2 3	2 29 43.00	21 36 45.6	23.5	22.8	1.63
12	3 6	0 35 31.45	5 19 26.4	12.7	12.3	0.83	30	2 0	2 30 18.33	21 44 40.3	23.9	23.2	1.66
13	3 6	0 39 3.66	5 48 57.6	12.8	12.4	0.83	31	1 57	2 30 45.18	21 51 36.2	24.2	23.5	1.69
14	3 6	0 42 34.40	+ 6 18 18.4	12.9	12.6	0.84	Apr. 1	1 53	2 31 3.37	+21 57 31.0	24.6	23.9	1.72
15	3 5	0 46 3.62	+ 6 47 28.0	13.1	12.7	0.85	2	1 49	2 31 12.71	+22 2 22.4	25.0	24.3	1.75

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Tran- sit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Tran- sit.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
July 1	20 52	3 31 31.65	+15 42 8.9	12.7	12.3	0.86	Aug. 16	21 14	6 55 50.54	+21 19 37.2	8.4	8.2	0.59
2	20 52	3 35 20.35	15 55 41.2	12.5	12.2	0.85	17	21 15	7 0 42.96	21 16 26.9	8.3	8.1	0.58
3	20 51	3 39 11.20	16 9 9.7	12.4	12.0	0.84	18	21 16	7 5 35.80	21 12 42.9	8.3	8.0	0.58
4	20 51	3 43 4.16	16 22 33.3	12.3	11.9	0.83	19	21 17	7 10 28.97	21 8 25.1	8.2	8.0	0.57
5	20 51	3 46 59.19	16 35 51.0	12.1	11.8	0.82	20	21 18	7 15 22.44	21 3 33.4	8.2	7.9	0.57
6	20 51	3 50 56.27	+16 49 1.8	12.0	11.6	0.81	21	21 19	7 20 16.18	+20 58 7.8	8.1	7.9	0.56
7	20 51	3 54 55.36	17 2 4.7	11.9	11.5	0.80	22	21 20	7 25 10.13	20 52 8.2	8.1	7.8	0.56
8	20 51	3 58 56.42	17 14 58.8	11.7	11.4	0.80	23	21 21	7 30 4.23	20 45 34.6	8.0	7.8	0.56
9	20 52	4 2 59.43	17 27 43.2	11.6	11.3	0.79	24	21 22	7 34 58.44	20 38 27.0	8.0	7.7	0.55
10	20 52	4 7 4.36	17 40 16.8	11.5	11.2	0.78	25	21 23	7 39 52.71	20 30 45.3	7.9	7.7	0.55
11	20 52	4 11 11.19	+17 52 38.8	11.4	11.0	0.77	26	21 24	7 44 47.00	+20 22 29.7	7.9	7.6	0.55
12	20 52	4 15 19.89	18 4 48.3	11.3	10.9	0.77	27	21 25	7 49 41.26	20 13 40.4	7.8	7.6	0.54
13	20 52	4 19 30.44	18 16 44.5	11.2	10.8	0.76	28	21 26	7 54 35.43	20 4 17.5	7.8	7.6	0.54
14	20 52	4 23 42.82	18 28 26.3	11.0	10.7	0.75	29	21 27	7 59 29.48	19 54 21.0	7.7	7.5	0.53
15	20 53	4 27 57.00	18 39 52.9	10.9	10.6	0.75	30	21 28	8 4 23.37	19 43 51.1	7.7	7.5	0.53
16	20 53	4 32 12.96	+18 51 3.6	10.8	10.5	0.74	31	21 29	8 9 17.05	+19 32 48.1	7.6	7.4	0.53
17	20 53	4 36 30.67	19 1 57.4	10.7	10.4	0.74	Sept. 1	21 30	8 14 10.49	19 21 12.3	7.6	7.4	0.52
18	20 54	4 40 50.09	19 12 33.5	10.6	10.3	0.73	2	21 30	8 19 3.64	19 9 3.9	7.5	7.3	0.52
19	20 54	4 45 11.20	19 22 51.1	10.5	10.2	0.72	3	21 31	8 23 56.46	18 56 23.0	7.5	7.3	0.51
20	20 55	4 49 33.98	19 32 49.3	10.4	10.1	0.72	4	21 32	8 28 48.93	18 43 10.1	7.5	7.2	0.51
21	20 55	4 53 58.38	+19 42 27.4	10.3	10.0	0.71	5	21 33	8 33 41.02	+18 29 25.5	7.4	7.2	0.50
22	20 56	4 58 24.37	19 51 44.5	10.2	9.9	0.70	6	21 34	8 38 32.71	18 15 9.5	7.4	7.2	0.50
23	20 56	5 2 51.93	20 0 40.0	10.1	9.8	0.70	7	21 35	8 43 23.97	18 0 22.4	7.3	7.1	0.50
24	20 57	5 7 21.01	20 9 13.0	10.0	9.8	0.69	8	21 36	8 48 14.78	17 45 4.6	7.3	7.1	0.49
25	20 57	5 11 51.58	20 17 22.8	10.0	9.7	0.69	9	21 37	8 53 5.11	17 29 16.3	7.3	7.0	0.49
26	20 58	5 16 23.60	+20 25 8.7	9.9	9.6	0.68	10	21 38	8 57 54.96	+17 12 58.1	7.2	7.0	0.49
27	20 58	5 20 57.02	20 32 30.2	9.8	9.5	0.68	11	21 39	9 2 44.31	16 56 10.4	7.2	7.0	0.49
28	20 59	5 25 31.79	20 39 26.5	9.7	9.4	0.67	12	21 40	9 7 33.14	16 38 53.6	7.2	6.9	0.48
29	21 0	5 30 7.87	20 45 56.9	9.6	9.3	0.67	13	21 40	9 12 21.43	16 21 8.0	7.1	6.9	0.48
30	21 0	5 34 45.24	20 52 0.8	9.5	9.3	0.66	14	21 41	9 17 9.16	16 2 54.1	7.1	6.9	0.48
31	21 1	5 39 23.84	+20 57 37.6	9.5	9.2	0.66	15	21 42	9 21 56.34	+15 44 12.4	7.1	6.8	0.47
Aug. 1	21 2	5 44 3.62	21 2 46.7	9.4	9.2	0.65	16	21 43	9 26 42.97	15 25 3.4	7.0	6.8	0.47
2	21 2	5 48 44.54	21 7 27.6	9.3	9.1	0.65	17	21 44	9 31 29.02	15 5 27.6	7.0	6.8	0.47
3	21 3	5 53 26.54	21 11 39.9	9.2	9.0	0.64	18	21 45	9 36 14.50	14 45 25.5	7.0	6.7	0.46
4	21 4	5 58 9.57	21 15 23.0	9.2	8.9	0.64	19	21 45	9 40 59.41	14 24 57.6	6.9	6.7	0.46
5	21 5	6 2 53.59	+21 18 36.4	9.1	8.8	0.63	20	21 46	9 45 43.74	+14 4 4.4	6.9	6.7	0.46
6	21 6	6 7 38.55	21 21 19.8	9.0	8.8	0.63	21	21 47	9 50 27.48	13 42 46.5	6.9	6.6	0.46
7	21 6	6 12 24.42	21 23 32.6	9.0	8.7	0.62	22	21 48	9 55 10.63	13 21 4.5	6.8	6.6	0.45
8	21 7	6 17 11.14	21 25 14.5	8.9	8.6	0.62	23	21 48	9 59 53.21	12 58 59.0	6.8	6.6	0.45
9	21 8	6 21 58.69	21 26 25.2	8.8	8.6	0.61	24	21 49	10 4 35.21	12 36 30.5	6.8	6.6	0.45
10	21 9	6 26 47.01	+21 27 4.3	8.8	8.5	0.61	25	21 50	10 9 16.65	+12 13 39.5	6.7	6.5	0.45
11	21 10	6 31 36.05	21 27 11.4	8.7	8.5	0.61	26	21 51	10 13 57.52	11 50 26.9	6.7	6.5	0.44
12	21 11	6 36 25.76	21 26 46.1	8.6	8.4	0.60	27	21 52	10 18 37.83	11 26 53.3	6.7	6.5	0.44
13	21 12	6 41 16.12	21 25 48.3	8.6	8.3	0.60	28	21 52	10 23 17.58	11 2 59.3	6.6	6.5	0.44
14	21 13	6 46 7.07	21 24 17.7	8.5	8.3	0.59	29	21 53	10 27 56.79	10 38 45.5	6.6	6.4	0.44
15	21 14	6 50 58.56	+21 22 14.1	8.5	8.2	0.59	30	21 54	10 32 35.47	+10 14 12.5	6.6	6.4	0.43
16	21 14	6 55 50.54	+21 19 37.2	8.4	8.2	0.59	Oct. 1	21 54	10 37 13.63	+ 9 49 21.0	6.6	6.4	0.43

FOR TRANSIT AT WASHINGTON.

FOR TRANSIT AT WASHINGTON.

										R.	Semidiam.											Mean Time of Transit.	Apparent Right Ascension.	Apparent Declination.	H. P.	Semidiam.	S. T. of Sem. Pass. Mer.
										"	"											h m s	h m s	° ' "	"	"	"
Oct.	1	17	56	6	38	6.57	+23	29	55.0	7.9	4.6	c	6	16	2	7	44	50.58	+23	11	50.5	11.1	6.4	0.46			
	2	17	54	6	40	12.91	23	29	30.5	8.0	4.6	c	7	15	58	7	45	22.57	23	13	11.6	11.2	6.4	0.46			
	3	17	52	6	42	17.94	23	29	2.1	8.0	4.6	c	8	15	55	7	45	51.48	23	14	41.5	11.2	6.5	0.47			
	4	17	50	6	44	21.66	23	28	30.0	8.1	4.6	c	9	15	51	7	46	17.25	23	16	20.4	11.3	6.5	0.47			
	5	17	48	6	46	24.03	23	27	54.4	8.1	4.7	c	10	15	48	7	46	39.82	23	18	8.4	11.4	6.6	0.48			
	6	17	46	6	48	25.02	+23	27	15.6	8.2	4.7	c	1	15	44	7	46	59.14	+23	20	5.9	11.5	6.6	0.48			
	7	17	45	6	50	24.63	23	26	33.9	8.2	4.7	c	2	15	40	7	47	15.15	23	22	12.9	11.6	6.7	0.48			
	8	17	43	6	52	22.85	23	25	49.6	8.3	4.8	c	3	15	37	7	47	27.80	23	24	29.5	11.7	6.7	0.49			
	9	17	41	6	54	19.64	23	25	2.8	8.3	4.8	c	4	15	33	7	47	37.05	23	26	56.0	11.8	6.8	0.49			
	10	17	39	6	56	14.97	23	24	13.9	8.4	4.8	c	5	15	29	7	47	42.84	23	29	32.2	11.9	6.9	0.49			
	11	17	37	6	58	8.81	+23	23	23.0	8.5	4.9	0.35	26	15	25	7	47	45.13	+23	32	18.2	12.0	6.9	0.50			
	12	17	34	7	0	1.13	23	22	30.4	8.5	4.9	0.35	27	15	21	7	47	43.90	23	35	14.1	12.1	6.9	0.50			
	13	17	32	7	1	51.91	23	21	36.4	8.6	4.9	0.35	28	15	17	7	47	39.11	23	38	19.7	12.2	7.0	0.51			
	14	17	30	7	3	41.11	23	20	41.2	8.6	4.9	0.36	29	15	13	7	47	30.74	23	41	35.2	12.3	7.0	0.51			
	15	17	28	7	5	28.72	23	19	45.1	8.7	5.0	0.36	30	15	9	7	47	18.76	23	45	0.3	12.4	7.1	0.51			
	Nov.	16	17	26	7	7	14.70	+23	18	48.4	8.7	5.0	0.36	Dec. 1	15	5	7	47	3.15	+23	48	34.9	12.4	7.1	0.52		
17		17	24	7	8	59.00	23	17	51.4	8.8	5.0	0.37	2	15	0	7	46	43.89	23	52	18.8	12.5	7.2	0.52			
18		17	22	7	10	41.60	23	16	54.3	8.8	5.1	0.37	3	14	56	7	46	20.98	23	56	11.8	12.6	7.2	0.52			
19		17	19	7	12	22.46	23	15	57.6	8.9	5.1	0.37	4	14	52	7	45	54.42	24	0	13.7	12.7	7.3	0.53			
20		17	17	7	14	1.54	23	15	1.4	8.9	5.1	0.37	5	14	48	7	45	24.20	24	4	24.2	12.8	7.3	0.53			
21		17	15	7	15	38.81	+23	14	6.0	9.0	5.2	0.37	6	14	43	7	44	50.31	+24	8	42.9	12.9	7.4	0.54			
22		17	12	7	17	14.22	23	13	11.7	9.1	5.2	0.37	7	14	38	7	44	12.77	24	13	9.5	13.0	7.4	0.54			
23		17	10	7	18	47.71	23	12	18.9	9.1	5.2	0.37	8	14	34	7	43	31.58	24	17	43.7	13.0	7.5	0.55			
24		17	8	7	20	19.25	23	11	27.8	9.2	5.3	0.38	9	14	29	7	42	46.78	24	22	25.0	13.1	7.5	0.55			
25		17	5	7	21	48.79	23	10	38.8	9.3	5.3	0.38	10	14	24	7	41	58.38	24	27	12.9	13.2	7.6	0.55			
26		17	3	7	23	16.30	+23	9	52.4	9.3	5.4	0.38	11	14	20	7	41	6.43	+24	32	7.0	13.3	7.6	0.56			
27		17	0	7	24	41.74	23	9	8.7	9.4	5.4	0.38	12	14	15	7	40	10.95	24	37	6.7	13.4	7.7	0.56			
28		16	58	7	26	5.06	23	8	28.0	9.5	5.4	0.39	13	14	10	7	39	11.97	24	42	11.4	13.4	7.7	0.56			
29		16	55	7	27	26.21	23	7	50.7	9.5	5.5	0.39	14	14	5	7	38	9.56	24	47	20.7	13.5	7.7	0.57			
30		16	52	7	28	45.16	23	7	17.0	9.6	5.5	0.39	15	14	0	7	37	3.78	24	52	33.9	13.6	7.8	0.57			
Dec.		31	16	50	7	30	1.87	+23	6	47.4	9.7	5.6	0.39	16	13	55	7	35	54.69	+24	57	50.3	13.6	7.8	0.57		
	1	16	47	7	31	16.30	23	6	22.1	9.8	5.6	0.40	17	13	50	7	34	42.35	25	3	9.3	13.7	7.8	0.57			
	2	16	44	7	32	28.41	23	6	1.3	9.9	5.7	0.41	18	13	44	7	33	26.86	25	8	30.1	13.8	7.9	0.57			
	3	16	42	7	33	38.17	23	5	45.5	10.0	5.7	0.41	19	13	39	7	32	8.32	25	13	52.1	13.8	7.9	0.57			
	4	16	39	7	34	45.53	23	5	34.8	10.1	5.8	0.42	20	13	34	7	30	46.85	25	19	14.4	13.9	7.9	0.58			
	5	16	36	7	35	50.45	+23	5	29.6	10.1	5.8	0.42	21	13	29	7	29	22.55	+25	24	36.2	13.9	8.0	0.58			
	6	16	33	7	36	52.88	23	5	30.1	10.2	5.9	0.42	22	13	23	7	27	55.56	25	29	56.9	13.9	8.0	0.58			
	7	16	30	7	37	52.79	23	5	36.7	10.3	5.9	0.43	23	13	18	7	26	26.03	25	35	15.6	14.0	8.0	0.58			
	8	16	27	7	38	50.13	23	5	49.6	10.4	6.0	0.43	24	13	12	7	24	54.11	25	40	31.5	14.0	8.0	0.59			
	9	16	24	7	39	44.85	23	6	9.1	10.5	6.0	0.43	25	13	7	7	23	19.97	25	45	43.7	14.0	8.0	0.59			
	10	16	21	7	40	36.90	+23	6	35.4	10.6	6.1	0.44	26	13	1	7	21	43.80	+25	50	51.5	14.1	8.1	0.59			
	11	16	18	7	41	26.25	23	7	8.8	10.6	6.1	0.44	27	12	56	7	20	5.79	25	55	54.1	14.1	8.1	0.59			
	12	16	15	7	42	12.85	23	7	49.5	10.7	6.2	0.44	28	12	50	7	18	26.14	26	0	50.7	14.1	8.1	0.60			
	13	16	11	7	42	56.63	23	8	37.7	10.8	6.2	0.45	29	12	45	7	16	45.06	26	5	40.4	14.1	8.1	0.60			
	14	16	8	7	43	37.55	23	9	33.8	10.9	6.3	0.45	30	12	39	7	15	2.76	26	10	22.6	14.1	8.1	0.60			
	15	16	5	7	44	15.55	+23	10	38.0	11.0	6.3	0.45	31	12	33	7	13	19.45	+26	14	56.7	14.1	8.1	0.60			
16	16	2	7	44	50.58	+23	11	50.5	11.1	6.4	0.46	32	12	28	7	11	35.34	+26	19	22.1	14.1	8.1	0.60				

Stellar magnitude at opposition, in January, 1914. —1.3.

[Eph 13]

FOR TRANSIT AT WASHINGTON.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s	
July	1	12 20	18 58 11.40	-22 52 3.2	2.1	22.5	1.74	Aug. 16	8 58	18 37 15.97	-23 21 45.8	2.0	21.4	1.64
	2	12 15	18 57 38.35	22 52 57.5	2.1	22.5	1.74	17	8 54	18 37 1.44	23 22 5.0	2.0	21.3	1.64
	3	12 11	18 57 5.23	22 53 51.4	2.1	22.5	1.74	18	8 50	18 36 47.66	23 22 23.4	2.0	21.3	1.64
	4	12 6	18 56 32.07	22 54 44.9	2.1	22.5	1.74	19	8 45	18 36 34.64	23 22 40.9	2.0	21.2	1.63
	5	12 2	18 55 58.88	22 55 38.0	2.1	22.5	1.74	20	8 41	18 36 22.39	23 22 57.7	2.0	21.2	1.63
	6	11 57	18 55 25.70	-22 56 30.5	2.1	22.5	1.74	21	8 37	18 36 10.93	-23 23 13.8	2.0	21.1	1.63
	7	11 53	18 54 52.54	22 57 22.6	2.1	22.5	1.74	22	8 33	18 36 0.25	23 23 29.1	2.0	21.1	1.63
	8	11 48	18 54 19.44	22 58 14.2	2.1	22.5	1.74	23	8 29	18 35 50.37	23 23 43.6	2.0	21.0	1.62
	9	11 44	18 53 46.42	22 59 5.3	2.1	22.5	1.74	24	8 25	18 35 41.28	23 23 57.3	2.0	21.0	1.62
	10	11 39	18 53 13.51	22 59 55.8	2.1	22.5	1.74	25	8 21	18 35 32.99	23 24 10.2	2.0	20.9	1.62
	11	11 35	18 52 40.72	-23 0 45.7	2.1	22.5	1.74	26	8 17	18 35 25.51	-23 24 22.3	1.9	20.8	1.61
	12	11 30	18 52 8.07	23 1 35.0	2.1	22.5	1.74	27	8 13	18 35 18.84	23 24 33.7	1.9	20.8	1.60
	13	11 26	18 51 35.60	23 2 23.5	2.1	22.5	1.74	28	8 9	18 35 12.99	23 24 44.3	1.9	20.7	1.60
	14	11 21	18 51 3.32	23 3 11.3	2.1	22.5	1.74	29	8 5	18 35 7.96	23 24 54.1	1.9	20.7	1.59
	15	11 17	18 50 31.24	23 3 58.4	2.1	22.5	1.74	30	8 1	18 35 3.76	23 25 3.2	1.9	20.6	1.59
	16	11 12	18 49 59.40	-23 4 44.8	2.1	22.5	1.74	31	7 57	18 35 0.39	-23 25 11.6	1.9	20.6	1.58
	17	11 8	18 49 27.81	23 5 30.4	2.1	22.4	1.74	Sept. 1	7 53	18 34 57.84	23 25 19.2	1.9	20.5	1.58
	18	11 4	18 48 56.51	23 6 15.2	2.1	22.4	1.73	2	7 49	18 34 56.11	23 25 26.0	1.9	20.5	1.57
	19	10 59	18 48 25.52	23 6 59.2	2.1	22.4	1.73	3	7 45	18 34 55.22	23 25 32.1	1.9	20.4	1.57
	20	10 55	18 47 54.84	23 7 42.4	2.1	22.4	1.73	4	7 41	18 34 55.17	23 25 37.4	1.9	20.4	1.57
	21	10 50	18 47 24.49	-23 8 24.7	2.1	22.4	1.73	5	7 37	18 34 55.96	-23 25 41.9	1.9	20.3	1.56
	22	10 46	18 46 54.49	23 9 6.3	2.1	22.4	1.73	6	7 33	18 34 57.58	23 25 45.7	1.9	20.2	1.56
	23	10 41	18 46 24.88	23 9 47.2	2.1	22.4	1.72	7	7 29	18 35 0.04	23 25 48.8	1.9	20.1	1.56
	24	10 37	18 45 55.67	23 10 27.2	2.1	22.3	1.72	8	7 25	18 35 3.32	23 25 51.1	1.9	20.1	1.55
	25	10 32	18 45 26.88	23 11 6.3	2.1	22.3	1.72	9	7 21	18 35 7.42	23 25 52.7	1.9	20.0	1.55
	26	10 28	18 44 58.53	-23 11 44.5	2.1	22.3	1.72	10	7 18	18 35 12.34	-23 25 53.5	1.9	19.9	1.54
	27	10 24	18 44 30.64	23 12 21.9	2.1	22.2	1.71	11	7 14	18 35 18.09	23 25 53.6	1.9	19.9	1.54
	28	10 19	18 44 3.23	23 12 58.4	2.1	22.2	1.71	12	7 10	18 35 24.65	23 25 53.0	1.9	19.8	1.54
	29	10 15	18 43 36.32	23 13 34.0	2.1	22.2	1.71	13	7 6	18 35 32.03	23 25 51.6	1.9	19.7	1.53
	30	10 11	18 43 9.92	23 14 8.8	2.1	22.2	1.71	14	7 2	18 35 40.23	23 25 49.4	1.8	19.7	1.53
	31	10 6	18 42 44.06	-23 14 42.7	2.1	22.1	1.71	15	6 58	18 35 49.23	-23 25 46.5	1.8	19.6	1.52
Aug.	1	10 2	18 42 18.75	23 15 15.7	2.1	22.1	1.70	16	6 55	18 35 59.03	23 25 42.8	1.8	19.6	1.52
	2	9 58	18 41 54.01	23 15 47.8	2.0	22.1	1.70	17	6 51	18 36 9.63	23 25 38.3	1.8	19.5	1.51
	3	9 53	18 41 29.87	23 16 19.1	2.0	22.1	1.70	18	6 47	18 36 21.03	23 25 33.0	1.8	19.5	1.51
	4	9 49	18 41 6.34	23 16 49.5	2.0	22.0	1.69	19	6 44	18 36 33.23	23 25 27.0	1.8	19.4	1.50
	5	9 45	18 40 43.42	-23 17 19.1	2.0	21.9	1.69	20	6 40	18 36 46.22	-23 25 20.2	1.8	19.3	1.50
	6	9 40	18 40 21.13	23 17 47.7	2.0	21.9	1.69	21	6 36	18 36 59.99	23 25 12.5	1.8	19.3	1.49
	7	9 36	18 39 59.50	23 18 15.4	2.0	21.8	1.69	22	6 32	18 37 14.55	23 25 4.1	1.8	19.2	1.49
	8	9 32	18 39 38.53	23 18 42.3	2.0	21.7	1.68	23	6 29	18 37 29.90	23 24 54.9	1.8	19.1	1.48
	9	9 27	18 39 18.24	23 19 8.3	2.0	21.7	1.68	24	6 25	18 37 46.02	23 24 44.9	1.8	19.1	1.48
	10	9 23	18 38 58.64	-23 19 33.4	2.0	21.7	1.68	25	6 21	18 38 2.92	-23 24 34.0	1.8	19.0	1.47
	11	9 19	18 38 39.73	23 19 57.6	2.0	21.6	1.67	26	6 18	18 38 20.58	23 24 22.2	1.8	19.0	1.47
	12	9 15	18 38 21.53	23 20 20.9	2.0	21.6	1.67	27	6 14	18 38 39.00	23 24 9.6	1.8	18.9	1.47
	13	9 10	18 38 4.04	23 20 43.4	2.0	21.5	1.66	28	6 10	18 38 58.18	23 23 56.1	1.8	18.8	1.46
	14	9 6	18 37 47.28	23 21 5.0	2.0	21.5	1.66	29	6 7	18 39 18.11	23 23 41.7	1.8	18.8	1.46
	15	9 2	18 37 31.25	-23 21 25.8	2.0	21.4	1.65	30	6 3	18 39 38.79	-23 23 26.5	1.8	18.7	1.45
	16	8 58	18 37 15.97	-23 21 45.8	2.0	21.4	1.64	Oct. 1	6 0	18 40 0.22	-23 23 10.4	1.7	18.7	1.45

Stellar magnitude at opposition, in July, 1913. -2.2.

FOR TRANSIT AT WASHINGTON.

FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Trans- it.	Apparent Right Ascension.	Apparent Declination.	Hor. Par.	Semidiam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	16 27	5 9 12.55	+21 13 54.9	1.0	8.9	0.70	Nov. 16	13 18	5 1 6.84	+21 0 19.9	1.1	9.5	0.75
2	16 23	5 9 11.65	21 13 47.4	1.0	9.0	0.70	17	13 14	5 0 48.10	20 59 53.5	1.1	9.5	0.75
3	16 19	5 9 10.28	21 13 39.5	1.0	9.0	0.71	18	13 10	5 0 29.13	20 59 26.9	1.1	9.6	0.75
4	16 15	5 9 8.45	21 13 31.1	1.0	9.0	0.71	19	13 6	5 0 9.95	20 59 0.1	1.1	9.6	0.75
5	16 11	5 9 6.14	21 13 22.1	1.0	9.0	0.71	20	13 1	4 59 50.58	20 58 33.1	1.1	9.6	0.75
6	16 7	5 9 3.36	+21 13 12.6	1.0	9.0	0.71	21	12 57	4 59 31.02	+20 58 5.8	1.1	9.6	0.75
7	16 3	5 9 0.12	21 13 2.7	1.0	9.0	0.71	22	12 53	4 59 11.27	20 57 38.3	1.1	9.6	0.75
8	15 59	5 8 56.41	21 12 52.3	1.0	9.1	0.71	23	12 49	4 58 51.36	20 57 10.7	1.1	9.6	0.75
9	15 55	5 8 52.23	21 12 41.3	1.0	9.1	0.71	24	12 44	4 58 31.29	20 56 43.0	1.1	9.6	0.75
10	15 51	5 8 47.60	21 12 29.8	1.0	9.1	0.71	25	12 40	4 58 11.07	20 56 15.2	1.1	9.6	0.75
11	15 47	5 8 42.52	+21 12 17.9	1.0	9.1	0.71	26	12 36	4 57 50.71	+20 55 47.2	1.1	9.6	0.75
12	15 43	5 8 36.98	21 12 5.5	1.0	9.1	0.71	27	12 31	4 57 30.23	20 55 19.1	1.1	9.6	0.75
13	15 39	5 8 30.98	21 11 52.6	1.0	9.1	0.72	28	12 27	4 57 9.64	20 54 51.0	1.1	9.6	0.75
14	15 35	5 8 24.53	21 11 39.2	1.0	9.2	0.72	29	12 23	4 56 48.95	20 54 22.8	1.1	9.6	0.75
15	15 31	5 8 17.63	21 11 25.3	1.0	9.2	0.72	30	12 19	4 56 28.17	20 53 54.5	1.1	9.6	0.75
16	15 27	5 8 10.28	+21 11 10.9	1.0	9.2	0.72	Dec. 1	12 14	4 56 7.33	+20 53 26.2	1.1	9.6	0.75
17	15 23	5 8 2.49	21 10 56.0	1.0	9.2	0.72	2	12 10	4 55 46.43	20 52 57.9	1.1	9.6	0.75
18	15 19	5 7 54.26	21 10 40.7	1.0	9.2	0.72	3	12 6	4 55 25.47	20 52 29.7	1.1	9.6	0.75
19	15 15	5 7 45.59	21 10 24.9	1.0	9.2	0.72	4	12 1	4 55 4.47	20 52 1.5	1.1	9.6	0.75
20	15 11	5 7 36.49	21 10 8.7	1.0	9.2	0.72	5	11 57	4 54 43.46	20 51 33.2	1.1	9.6	0.75
21	15 7	5 7 26.95	+21 9 52.0	1.1	9.3	0.73	6	11 53	4 54 22.44	+20 51 5.0	1.1	9.6	0.75
22	15 3	5 7 16.99	21 9 34.9	1.1	9.3	0.73	7	11 49	4 54 1.42	20 50 36.8	1.1	9.6	0.75
23	14 59	5 7 6.61	21 9 17.3	1.1	9.3	0.73	8	11 44	4 53 40.41	20 50 8.8	1.1	9.6	0.75
24	14 54	5 6 55.81	21 8 59.3	1.1	9.3	0.73	9	11 40	4 53 19.43	20 49 40.9	1.1	9.6	0.75
25	14 50	5 6 44.59	21 8 40.9	1.1	9.3	0.73	10	11 36	4 52 58.48	20 49 13.1	1.1	9.6	0.75
26	14 46	5 6 32.96	+21 8 22.1	1.1	9.3	0.73	11	11 32	4 52 37.58	+20 48 45.5	1.1	9.6	0.75
27	14 42	5 6 20.92	21 8 2.8	1.1	9.3	0.73	12	11 27	4 52 16.73	20 48 18.1	1.1	9.6	0.75
28	14 38	5 6 8.49	21 7 43.0	1.1	9.3	0.73	13	11 23	4 51 55.96	20 47 50.8	1.1	9.6	0.75
29	14 34	5 5 55.67	21 7 22.9	1.1	9.4	0.73	14	11 19	4 51 35.27	20 47 23.7	1.1	9.6	0.75
30	14 30	5 5 42.46	21 7 2.4	1.1	9.4	0.73	15	11 14	4 51 14.67	20 46 56.8	1.1	9.6	0.75
31	14 26	5 5 28.88	+21 6 41.5	1.1	9.4	0.73	16	11 10	4 50 54.18	+20 46 30.2	1.1	9.6	0.75
Nov. 1	14 21	5 5 14.93	21 6 20.2	1.1	9.4	0.74	17	11 6	4 50 33.81	20 46 3.9	1.1	9.6	0.75
2	14 17	5 5 0.61	21 5 58.6	1.1	9.4	0.74	18	11 2	4 50 13.56	20 45 37.8	1.1	9.6	0.75
3	14 13	5 4 45.95	21 5 36.5	1.1	9.4	0.74	19	10 57	4 49 53.44	20 45 12.0	1.1	9.6	0.75
4	14 9	5 4 30.94	21 5 14.1	1.1	9.4	0.74	20	10 53	4 49 33.47	20 44 46.6	1.1	9.6	0.75
5	14 5	5 4 15.58	+21 4 51.4	1.1	9.4	0.74	21	10 49	4 49 13.67	+20 44 21.5	1.1	9.6	0.75
6	14 0	5 3 59.89	21 4 28.2	1.1	9.4	0.74	22	10 44	4 48 54.04	20 43 56.7	1.1	9.6	0.75
7	13 56	5 3 43.89	21 4 4.7	1.1	9.5	0.74	23	10 40	4 48 34.60	20 43 32.3	1.1	9.6	0.75
8	13 52	5 3 27.58	21 3 40.9	1.1	9.5	0.74	24	10 36	4 48 15.35	20 43 8.3	1.1	9.6	0.75
9	13 48	5 3 10.96	21 3 16.8	1.1	9.5	0.74	25	10 32	4 47 56.31	20 42 44.8	1.1	9.6	0.75
10	13 44	5 2 54.05	+21 2 52.4	1.1	9.5	0.74	26	10 28	4 47 37.49	+20 42 21.7	1.1	9.6	0.75
11	13 39	5 2 36.85	21 2 27.7	1.1	9.5	0.74	27	10 23	4 47 18.90	20 41 59.1	1.1	9.5	0.75
12	13 35	5 2 19.37	21 2 2.7	1.1	9.5	0.74	28	10 19	4 47 0.55	20 41 37.0	1.1	9.5	0.74
13	13 31	5 2 1.62	21 1 37.4	1.1	9.5	0.75	29	10 15	4 46 42.45	20 41 15.4	1.1	9.5	0.74
14	13 27	5 1 43.60	21 1 11.8	1.1	9.5	0.75	30	10 11	4 46 24.62	20 40 54.4	1.1	9.5	0.74
15	13 22	5 1 25.34	+21 0 46.0	1.1	9.5	0.75	31	10 6	4 46 7.06	+20 40 33.9	1.1	9.5	0.74
16	13 18	5 1 6.84	+21 0 19.9	1.1	9.5	0.75	32	10 2	4 45 49.78	+20 40 14.1	1.1	9.5	0.74

Stellar magnitude at opposition, in December, 1913, -0.2.

[Eph 13]

FOR TRANSIT AT WASHINGTON.

PART III.

PHENOMENA.

In the year 1913 there will be five eclipses, three of the Sun and two of the Moon.

I.—*A Total Eclipse of the Moon*, 1913, March 21–22, partly visible at Washington, the Moon setting eclipsed; the beginning visible generally in North America, western South America, throughout the Pacific Ocean, Australia, and the eastern border of Asia; the ending visible generally in western North America, the Pacific Ocean, Australia, central and eastern Asia.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of 8 in right ascension, March				d	h	m	s
				21	23	47	57.7
Sun's right ascension	h	m	s	Hourly motion			
	0	4	37.49				
Moon's right ascension	12	4	37.49	Hourly motion			
	0	'	"				
Sun's declination	0	30	5.7 N.	Hourly motion			
	0	18	26.1 S.	Hourly motion			
Moon's declination	0	18	26.1 S.				
Sun's equa. hor. parallax	8.8			Sun's true semidiameter			
Moon's equa. hor. parallax	60	58.9		Moon's true semidiameter			

CIRCUMSTANCES OF THE ECLIPSE.

		d	h	m	} Greenwich Mean Time.
Moon enters penumbra	March	21	21	16.3	
Moon enters shadow		21	22	12.6	
Total eclipse begins		21	23	10.9	
Middle of the eclipse		21	23	57.6	
Total eclipse ends		22	0	44.4	
Moon leaves shadow		22	1	42.6	
Moon leaves penumbra		22	2	38.9	

Contacts of Shadow with Moon's limb.	Angles of position from the north point.	The Moon being in the zenith	
		in longitude from Greenwich.	and in latitude.
First	128 to E.	152 11 W.	0 10 N.
Last	70 to W.	157 6 E.	0 53 S.

Magnitude of the eclipse=1.575 (Moon's diameter=1.0).

II.—*A Partial Eclipse of the Sun*, 1913, April 6, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of 6 in right ascension, April				d	h	m	s
				6	6	54	57.9
Sun and Moon's R. A.	h	m	s	Hourly motion			
	1	0	18.70	9.14 and 109.32			
	0	'	"				
Sun's declination	6	26	20.3 N.	Hourly motion			
	6	26	20.3 N.				
Moon's declination	7	47	54.8 N.	Hourly motion			
	7	47	54.8 N.				
Sun's equa. hor. parallax	8.8			Sun's true semidiameter			
Moon's equa. hor. parallax	54	51.4		Moon's true semidiameter			

CIRCUMSTANCES OF THE ECLIPSE.

	Greenwich Mean Time.			Longitude from Greenwich.		Latitude.
	d	h	m	°	'	
Eclipse begins	April	6	3 53.9	151	24.1 W.	28 59.0 N.
Greatest eclipse		6	5 32.9	175	32.3 E.	61 20.5 N.
Eclipse ends		6	7 11.2	37	49.1 E.	82 9.3 N.

Magnitude of greatest eclipse=0.424 (Sun's diameter=1.0).

III.—A *Partial Eclipse of the Sun*, 1913, August 31, invisible at Washington.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of δ in right ascension, August				d	h	m	s
				31	7	34	56.7
Sun and Moon's R. A.				h	m	s	
				10	37	45.36	
Hourly motion				s			s
							9.09 and 137.98
Sun's declination				°	'	"	
				8	39	48.0	N.
Hourly motion							° 54.1 S.
Moon's declination				10	19	39.3	N.
Hourly motion							17 14.2 S.
Sun's equa. hor. parallax						8.7	
Sun's true semidiameter						15	51.0
Moon's equa. hor. parallax				61		17.3	
Moon's true semidiameter						16	41.2

CIRCUMSTANCES OF THE ECLIPSE.

	Greenwich Mean Time.			Longitude from Greenwich.		Latitude.	
	d	h	m	°	'	°	'
Eclipse begins	August	31	8 2.5	13	16.0 E.	77	36.3 N.
Greatest eclipse		31	8 52.0	26	36.2 W.	61	36.5 N.
Eclipse ends		31	9 42.0	47	5.0 W.	43	44.5 N.

Magnitude of greatest eclipse = 0.151 (Sun's diameter = 1.0).

IV.—A *Total Eclipse of the Moon*, 1913, September 14-15, the moon setting at Washington as the eclipse begins; the beginning visible generally in North America excepting the extreme northern portions, the Pacific Ocean, Australia, and eastern Asia; the ending visible generally in Alaska, the Pacific Ocean excepting the eastern portions, Australia, and Asia.

ELEMENTS OF THE ECLIPSE.

Greenwich mean time of δ in right ascension, September				d	h	m	s
				15	0	34	9.4
Sun's right ascension				h	m	s	
				11	30	47.50	
Hourly motion							s
							8.97
Moon's right ascension				23	30	47.50	
Hourly motion							104.22
Sun's declination				°	'	"	
				3	9	22.0	N.
Hourly motion							° 57.7 S.
Moon's declination				3	22	23.2	S.
Hourly motion							14 8.8 N.
Sun's equa. hor. parallax						8.8	
Sun's true semidiameter						15	54.6
Moon's equa. hor. parallax				53		58.2	
Moon's true semidiameter						14	41.7

CIRCUMSTANCES OF THE ECLIPSE.

	Greenwich Mean Time.		
	d	h	m
Moon enters penumbra	September	14	21 39.9
Moon enters shadow		14	22 52.5
Total eclipse begins		15	0 1.0
Middle of the eclipse		15	0 48.1
Total eclipse ends		15	1 35.2
Moon leaves shadow		15	2 43.6
Moon leaves penumbra		15	3 56.3

Contacts of Shadow
with Moon's limb.

Angles of position
from the north point.

The Moon being in the zenith
in longitude
from Greenwich.

and in latitude.

First
Last

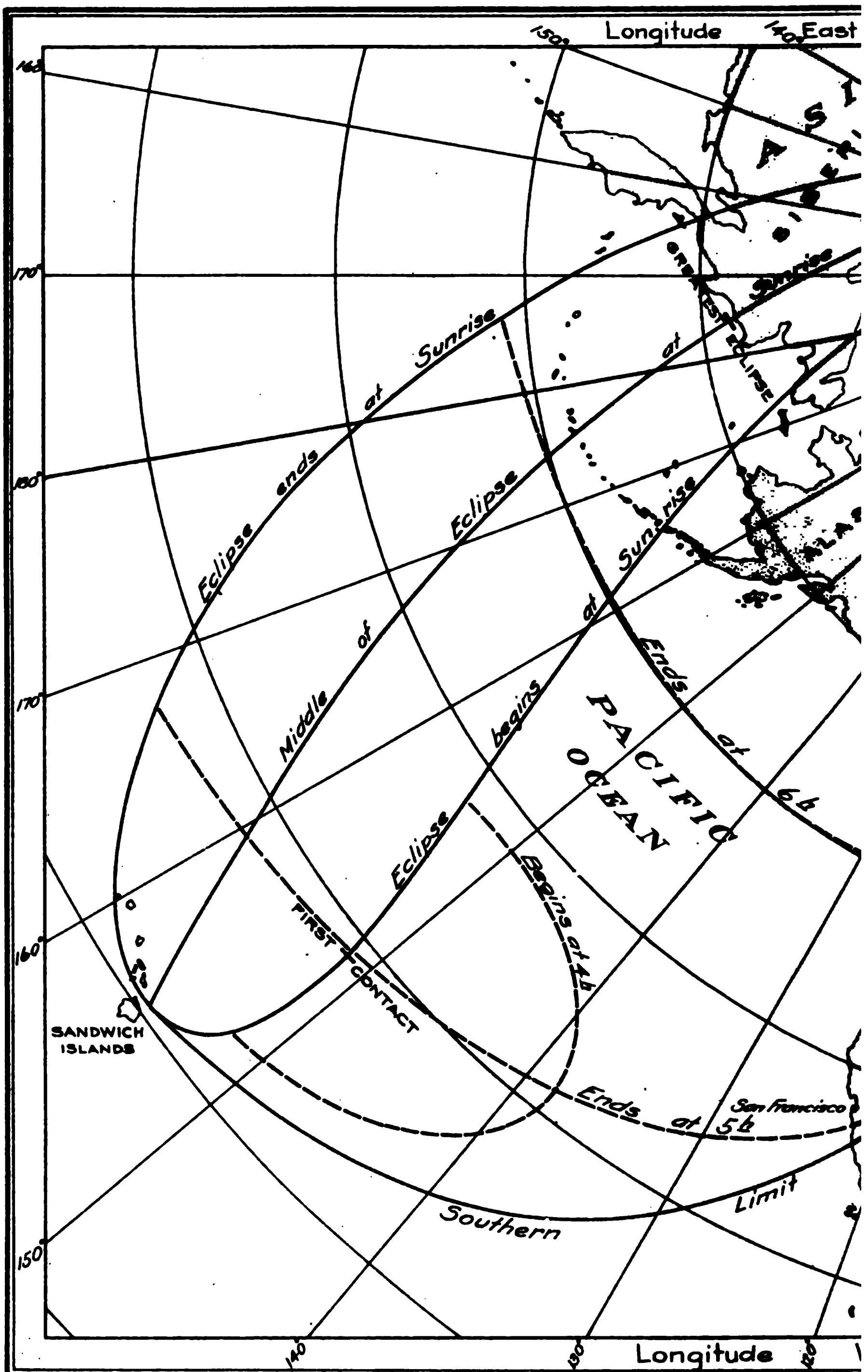
49 to E.
107 to W.

164 58 W.
138 46 E.

3 46 S.
2 52 S.

Magnitude of the eclipse = 1.435 (Moon's diameter = 1.0).

PARTIAL ECLIPSE



Note: The hours of beginning and

THE SUN APR. 6, 1913.

g are expressed in Greenwich Mean Time

IN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1913,
APRIL 6.

Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
<i>x</i>	<i>y</i>	Log sin <i>d</i>	Log cos <i>d</i>	<i>μ</i>	<i>l</i>
−1.39776	+0.74291	+9.04638	+9.99729	56 51.6	+0.56517
−1.32222	+0.78338	+9.04655	+9.99729	59 21.6	+0.56516
1.24668	0.82386	9.04672	9.99729	61 51.7	0.56515
1.17113	0.86433	9.04690	9.99729	64 21.7	0.56514
1.09558	0.90479	9.04707	9.99729	66 51.8	0.56513
1.02003	0.94526	9.04724	9.99728	69 21.8	0.56512
0.94447	0.98571	9.04741	9.99728	71 51.8	0.56511
−0.86891	+1.02617	+9.04758	+9.99728	74 21.9	+0.56510
0.79334	1.06662	9.04775	9.99728	76 51.9	0.56508
0.71777	1.10706	9.04792	9.99728	79 22.0	0.56507
0.64220	1.14751	9.04809	9.99727	81 52.0	0.56506
0.56663	1.18794	9.04826	9.99727	84 22.0	0.56504
0.49105	1.22838	9.04843	9.99727	86 52.1	0.56503
−0.41547	+1.26881	+9.04860	+9.99727	89 22.1	+0.56501
0.33988	1.30924	9.04877	9.99726	91 52.2	0.56500
0.26430	1.34966	9.04894	9.99726	94 22.2	0.56498
0.18871	1.39007	9.04911	9.99726	96 52.2	0.56496
0.11312	1.43048	9.04928	9.99726	99 22.3	0.56495
−0.03753	1.47089	9.04945	9.99726	101 52.3	0.56493
+0.03806	+1.51129	+9.04962	+9.99725	104 22.4	+0.56491
0.11366	1.55169	9.04979	9.99725	106 52.4	0.56489
+0.18926	+1.59208	+9.04995	+9.99725	109 22.4	+0.56487

Log <i>x'</i> for 1 Minute.	Log <i>y'</i> for 1 Minute.	Log <i>μ'</i> for 1 Minute.	Log Tangent of Angle of Cone.
			Penumbra.
+7.8780	+7.6074	+1.1762	+7.66942
7.8782	7.6072	1.1762	7.66941
7.8783	7.6069	1.1762	7.66941
7.8784	7.6067	1.1762	7.66940
7.8785	7.6064	1.1762	7.66940
+7.8785	+7.6061	+1.1762	+7.66939

BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1913,
AUGUST 31.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
	<i>x</i>	<i>y</i>	Log sin <i>d</i>	Log cos <i>d</i>	<i>μ</i>	<i>l</i>
<div>h m</div>					<div>° '</div>	
8 0	+0.21650	+1.52137	+9.17741	+9.99503	119 55.9	+0.53205
10	0.30290	1.47681	9.17729	9.99503	122 26.0	0.53205
20	0.38930	1.43224	9.17717	9.99503	124 56.0	0.53205
30	0.47570	1.38766	9.17705	9.99504	127 26.0	0.53205
40	0.56210	1.34308	9.17693	9.99504	129 56.1	0.53204
50	0.64850	1.29849	9.17681	9.99504	132 26.1	0.53204
9 0	+0.73489	+1.25389	+9.17669	+9.99504	134 56.2	+0.53204
10	0.82128	1.20928	9.17657	9.99505	137 26.2	0.53203
20	0.90766	1.16467	9.17645	9.99505	139 56.3	0.53203
30	0.99404	1.12005	9.17633	9.99505	142 26.3	0.53202
40	1.08042	1.07543	9.17621	9.99506	144 56.4	0.53201
50	+1.16679	+1.03079	+9.17609	+9.99506	147 26.4	+0.53200

Greenwich Mean Time.	Log <i>x</i> ' for 1 Minute.	Log <i>y</i> ' for 1 Minute.	Log <i>μ</i> ' for 1 Minute.	Log Tangent of Angle of Cone.
				Penumbra.
<div>h m</div>				
8 0	+7.9365	-7.6489	+1.1762	+7.66586
9 0	7.9364	7.6493	1.1762	7.66586
10 0	+7.9363	-7.6497	+1.1762	+7.66586

[Eph 13]

PARTIAL ECLIPSE



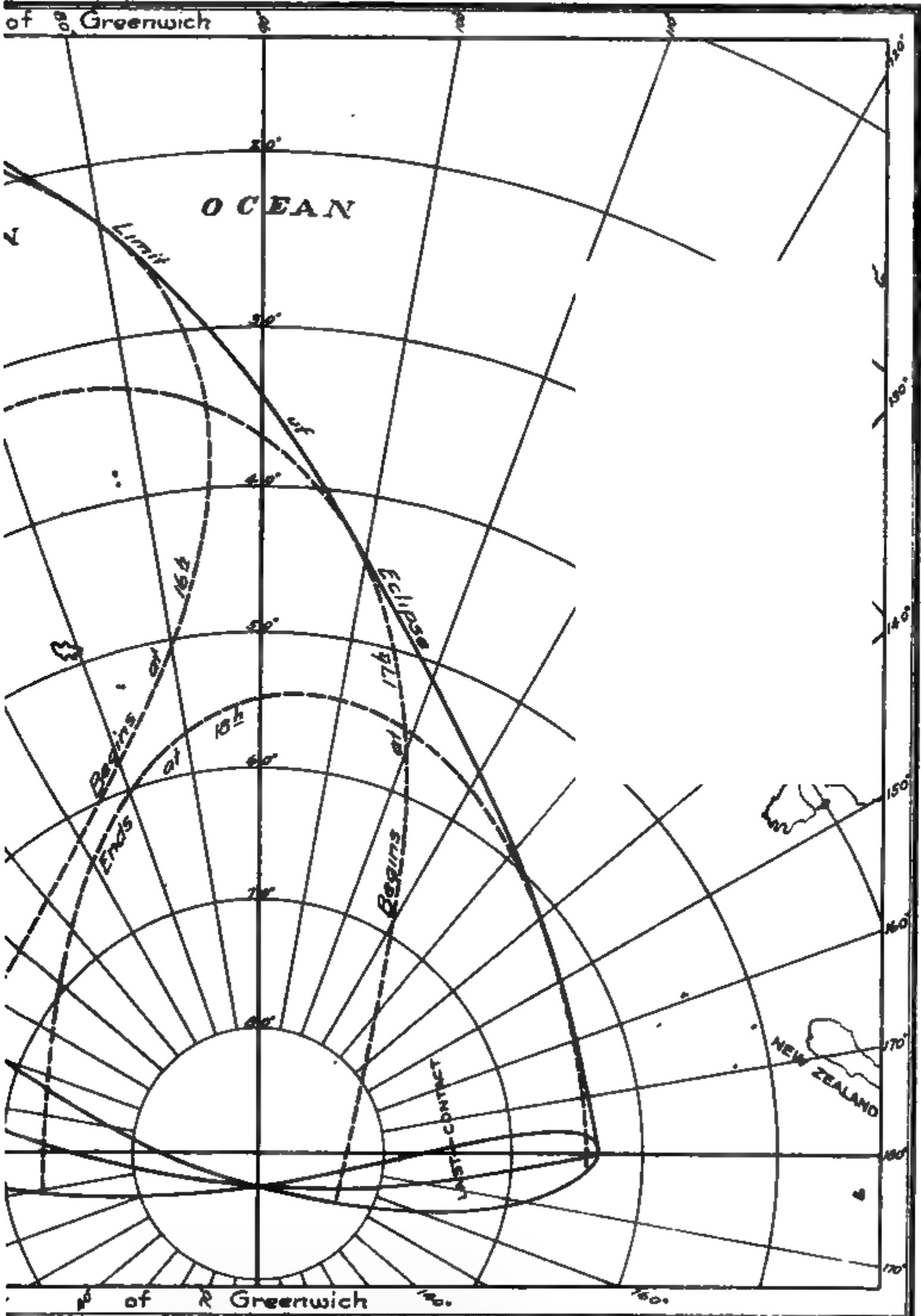
Note.—The hours of beginning and e.

PARTIAL ECLIPSE O

21

Note: The hours of beginning and

THE SUN SEPT. 29, 1913.



are expressed in Greenwich Mean Time

BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1913,

SEPTEMBER 29.

Greenwich Mean Time.	Coordinates of Center of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.
	<i>x</i>	<i>y</i>	Log sin <i>d</i>	Log cos <i>d</i>	<i>μ</i>	<i>l</i>
<div>h m</div>					<div>° '</div>	
14 50	−1.51422	−0.42211	−8.64261	+9.99958	224 55.7	+0.53401
15 0	−1.42919	−0.46901	−8.64305	+9.99958	227 25.8	+0.53402
10	1.34416	0.51591	8.64350	9.99958	229 55.8	0.53403
20	1.25913	0.56280	8.64394	9.99958	232 25.9	0.53404
30	1.17409	0.60969	8.64439	9.99958	234 55.9	0.53405
40	1.08904	0.65658	8.64483	9.99958	237 26.0	0.53406
50	1.00399	0.70346	8.64528	9.99958	239 56.0	0.53407
16 0	−0.91894	−0.75034	−8.64572	+9.99957	242 26.1	+0.53408
10	0.83389	0.79722	8.64616	9.99957	244 56.1	0.53409
20	0.74883	0.84409	8.64661	9.99957	247 26.2	0.53410
30	0.66378	0.89096	8.64705	9.99957	249 56.2	0.53410
40	0.57871	0.93783	8.64749	9.99957	252 26.3	0.53411
50	0.49365	0.98469	8.64793	9.99957	254 56.3	0.53411
17 0	−0.40858	−1.03155	−8.64837	+9.99957	257 26.4	+0.53412
10	0.32352	1.07840	8.64881	9.99957	259 56.4	0.53412
20	0.23845	1.12525	8.64925	9.99957	262 26.4	0.53413
30	0.15338	1.17209	8.64969	9.99957	264 56.5	0.53413
40	−0.06831	1.21893	8.65013	9.99957	267 26.5	0.53413
50	+0.01676	1.26577	8.65057	9.99957	269 56.6	0.53413
18 0	+0.10183	−1.31260	−8.65101	+9.99956	272 26.6	+0.53413
10	0.18690	1.35943	8.65145	9.99956	274 56.7	0.53413
20	0.27197	1.40625	8.65188	9.99956	277 26.7	0.53413
30	0.35704	1.45307	8.65232	9.99956	279 56.8	0.53413
40	+0.44211	−1.49988	−8.65276	+9.99956	282 26.8	+0.53412

Greenwich Mean Time.	Log <i>x</i> ' for 1 Minute.	Log <i>y</i> ' for 1 Minute.	Log <i>μ</i> ' for 1 Minute.	Log Tangent of Angle of Cone.
				Penumbra.
<div>h m</div>				
14 0	+7.9294	−7.6713	+1.1762	+7.66926
15 0	7.9296	7.6712	1.1762	7.66927
16 0	7.9297	7.6710	1.1762	7.66927
17 0	7.9298	7.6708	1.1762	7.66928
18 0	7.9298	7.6705	1.1762	7.66928
19 0	+7.9298	−7.6702	+1.1762	+7.66929

566 STARS OCCULTED BY THE MOON, 1913.

MEAN PLACES FOR 1913.0. (January 0^d.248, Washington.)

Name of Star.			Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.	
				h	m	s	s	°	'	"	"	
80	B.	Piscium	6.3	0	0	36.204	+0.0037	—	0	59	9.74	—0.051
98	B.	Piscium	6.3	0	13	19.533	+0.0051	+	1	12	18.47	+0.012
44		Piscium	6.0	0	20	56.538	—0.0014		1	27	28.44	—0.023
60		Piscium	6.2	0	42	53.577	+0.0010		6	15	58.97	—0.005
62		Piscium	6.1	0	43	46.490	+0.0070		6	49	30.47	+0.008
147	B.	Piscium	5.9	0	43	48.993	+0.0483	+	4	50	1.06	—1.132
δ		Piscium	4.6	0	44	10.031	+0.0055		7	6	42.47	—0.044
171	B.	Piscium	6.3	0	55	18.971	+0.0008		6	0	50.88	—0.005
ε		Piscium	4.4	0	58	25.585	—0.0054		7	25	19.06	+0.026
π		Piscium	5.6	1	32	29.044	—0.0049		11	41	48.48	+0.034
20	H. ¹	Arietis	6.4	2	4	36.174	+0.0112	+	16	49	0.11	—0.179
19		Arietis	5.8	2	8	18.423	+0.0071		14	52	21.24	—0.021
26		Arietis	6.2	2	25	45.474	+0.0050		19	28	10.97	—0.022
27		Arietis	6.4	2	26	4.705	+0.0029		17	19	10.34	—0.089
μ		Arietis	5.7	2	37	27.466	+0.0023		19	38	29.06	—0.038
40		Arietis	6.0	2	43	39.248	+0.0030	+	17	55	19.19	—0.019
47		Arietis	5.8	2	53	6.248	+0.0160		20	19	13.90	—0.021
ε		Arietis (mean)	4.6	2	54	14.034	—0.0009		20	59	34.63	—0.010
ζ		Arietis	5.0	3	9	53.856	—0.0019		20	43	21.42	—0.082
τ		Arietis	5.2	3	16	12.091	+0.0023		20	50	2.59	—0.033
66		Arietis	6.1	3	23	21.265	+0.0006	+	22	30	17.24	—0.112
7		Tauri	5.9	3	29	17.310	+0.0013		24	10	24.00	—0.023
11		Tauri	6.1	3	35	34.355	+0.0014		25	2	56.08	—0.008
16		Tauri	5.4	3	39	37.716	+0.0009		24	0	59.30	—0.049
17		Tauri	3.8	3	39	42.370	+0.0016		23	50	25.84	—0.050
18		Tauri	5.6	3	39	58.056	+0.0004	+	24	34	1.57	—0.038
q		Tauri	4.3	3	40	1.534	+0.0010		24	11	42.67	—0.034
20		Tauri	4.1	3	40	38.815	+0.0016		24	5	47.89	—0.044
21		Tauri	5.8	3	40	43.286	+0.0012		24	17	1.17	—0.046
22		Tauri	6.5	3	40	51.730	+0.0006		24	15	25.93	—0.039
23		Tauri	4.3	3	41	9.571	+0.0016	+	23	40	40.76	—0.050
η		Tauri	3.0	3	42	18.596	+0.0016		23	50	12.62	—0.050
104	B.	Tauri	5.5	3	43	11.596	+0.0008		23	9	16.73	—0.045
27		Tauri	3.7	3	43	59.164	+0.0013		23	47	17.28	—0.048
28		Tauri	5.2	3	44	0.447	+0.0009		23	52	17.91	—0.046
14	H.	Tauri	5.3	3	45	4.936	+0.0033	+	25	19	3.84	—0.103
36		Tauri	5.6	3	59	9.307	+0.0001		23	52	1.59	—0.022
ρ		Tauri	5.6	4	5	31.781	—0.0024		26	15	16.88	—0.042
φ		Tauri	5.0	4	15	0.019	—0.0019		27	8	36.18	—0.082
χ		Tauri	5.3	4	17	17.163	+0.0028		25	25	29.11	—0.029
5	B.	Aurigæ	5.7	4	35	52.941	+0.0036	+	28	26	49.66	—0.047
17	B.	Aurigæ	6.0	4	47	20.931	+0.0033		27	45	9.83	—0.037
38	B.	Aurigæ	6.5	4	59	11.449	—0.0001		27	34	31.05	—0.075
47	B.	Aurigæ	6.0	5	4	17.102	. . . .		27	55	17.55	. . .
354	B.	Tauri	6.4	5	15	31.438	—0.0027		27	52	11.83	—0.015
73	B.	Aurigæ	5.8	5	15	40.574	+0.0004	+	29	28	56.80	—0.011
22		Aurigæ	6.4	5	17	52.199	+0.0017		28	51	16.92	—0.031
β		Tauri	1.8	5	20	47.470	+0.0025		28	32	5.62	—0.177
107	B.	Aurigæ	6.5	5	30	27.878	—0.0013		27	36	22.57	—0.076
116	B.	Aurigæ	5.9	5	33	46.348	+0.0012		29	9	57.37	—0.010
406	B.	Tauri	5.6	5	45	29.087	—0.0013	+	27	56	34.00	+0.011
136		Tauri	4.6	5	47	51.568	+0.0013		27	35	33.15	—0.020
154	B.	Aurigæ	6.4	5	51	2.174	. . . .		28	55	45.63	. . .
415	B.	Tauri	6.1	5	55	32.512	+0.0018	+	27	34	7.20	—0.001

MEAN PLACES FOR 1913.0. (January 0^d.248, Washington.)

Name of Star.		Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.
			h	m	s	s	°	'	"	"
183	B. Aurigæ . . .	6.3	6	0	49.197	. . . .	+29	31	12.75	. . .
κ	Aurigæ . . .	4.4	6	9	50.125	-0.0044	29	31	51.90	-0.263
211	B. Aurigæ . . .	6.3	6	15	38.710	. . . .	29	34	52.49	. . .
49	Aurigæ . . .	5.1	6	29	43.354	-0.0001	28	5	27.44	-0.027
53	Aurigæ . . .	5.6	6	32	52.019	-0.0019	29	3	35.26	-0.022
54	Aurigæ . . .	5.8	6	34	3.971	-0.0012	+28	20	26.83	-0.025
28	Geminorum . . .	5.5	6	39	14.766	-0.0001	29	3	35.40	-0.026
47	Geminorum . . .	5.6	7	5	59.431	-0.0011	27	0	1.08	-0.051
53	Geminorum . . .	5.9	7	10	31.268	-0.0008	28	2	58.68	-0.002
134	B. Geminorum . . .	6.5	7	11	40.155	+0.0058	26	50	49.34	-0.134
59	Geminorum . . .	5.7	7	19	8.755	+0.0010	+27	48	25.05	+0.019
z	Geminorum . . .	3.9	7	20	19.517	-0.0086	27	58	18.72	-0.088
b ¹	Geminorum . . .	5.0	7	23	55.346	-0.0032	28	17	53.83	-0.063
b ²	Geminorum . . .	5.0	7	24	24.198	-0.0019	28	5	47.05	-0.030
v	Geminorum . . .	4.3	7	30	33.838	-0.0016	27	5	23.75	-0.109
c	Geminorum . . .	5.5	7	38	48.611	-0.0017	+25	59	30.50	-0.028
κ	Geminorum . . .	3.7	7	39	11.869	-0.0014	24	36	26.61	-0.060
φ	Geminorum . . .	5.0	7	48	10.529	-0.0020	26	59	30.75	-0.027
ω	Cancrī . . .	5.9	7	55	40.139	+0.0003	25	37	54.27	-0.004
5	B. Cancrī . . .	6.4	7	55	49.251	-0.0003	23	49	22.38	-0.047
4	Cancrī . . .	6.2	7	56	29.082	-0.0012	+25	19	46.94	+0.007
ψ	Cancrī . . .	5.9	8	5	12.915	-0.0055	25	46	19.80	-0.351
35	B. Cancrī . . .	6.4	8	8	32.572	-0.0017	23	24	0.66	-0.022
λ	Cancrī . . .	5.9	8	15	21.931	-0.0011	24	17	49.17	-0.028
28	Cancrī . . .	6.1	8	23	27.434	-0.0024	24	26	3.20	-0.072
v ¹	Cancrī . . .	5.7	8	26	22.034	-0.0056	+24	22	30.33	-0.069
v ²	Cancrī . . .	6.4	8	27	51.702	-0.0047	24	22	52.80	-0.068
γ	Cancrī . . .	4.7	8	38	15.247	-0.0071	21	46	55.44	-0.043
90	H. ¹ Cancrī . . .	6.1	9	8	39.299	-0.0007	21	38	31.89	-0.013
8	Leonis . . .	5.9	9	32	14.734	-0.0006	16	49	41.29	-0.015
107	B. Leonis . . .	6.3	10	0	57.911	-0.0023	+16	10	53.30	+0.017
34	Leonis . . .	6.4	10	6	57.661	+0.0037	13	47	6.24	-0.036
37	Leonis . . .	5.5	10	12	0.664	-0.0013	14	9	45.31	-0.014
45	Leonis . . .	5.8	10	23	3.380	+0.0011	10	12	22.66	-0.003
ρ	Leonis . . .	3.8	10	28	13.913	-0.0004	9	45	16.80	-0.003
l	Leonis . . .	5.3	10	44	41.160	+0.0001	+11	0	20.70	-0.033
56	Leonis . . .	6.1	10	51	30.512	-0.0013	6	38	59.88	-0.008
c	Leonis . . .	5.1	10	56	14.289	-0.0035	6	34	8.95	-0.025
χ	Leonis . . .	4.7	11	0	31.820	-0.0234	7	48	24.05	-0.040
308	B. Leonis . . .	5.8	11	9	30.653	+0.0032	8	32	12.82	-0.125
σ	Leonis . . .	4.1	11	16	39.080	-0.0062	+6	30	22.90	-0.013
80	Leonis . . .	6.4	11	21	21.848	-0.0051	4	20	21.14	-0.050
83	Leonis . . .	6.3	11	22	21.079	-0.0492	3	29	15.11	+0.187
τ	Leonis . . .	5.2	11	23	27.813	+0.0008	3	20	7.91	-0.016
89	Leonis . . .	5.7	11	29	54.838	-0.0121	3	32	36.62	-0.104
9	B. Virginis . . .	6.2	11	44	35.090	-0.0148	+0	9	53.53	+0.007
β	Virginis . . .	3.8	11	46	9.810	+0.0494	2	15	18.30	-0.275
27	B. Virginis . . .	6.5	11	54	36.394	-0.0033	+1	0	52.25	+0.033
31	B. Virginis . . .	6.4	11	56	34.536	-0.0006	-1	16	54.99	-0.075
13	Virginis . . .	5.9	12	14	12.665	+0.0019	0	18	13.14	-0.021
162	B. Virginis . . .	6.2	12	23	23.694	-0.0062	-4	8	2.24	-0.003
200	B. Virginis . . .	6.3	12	27	10.290	-0.0022	4	34	21.77	+0.035
f	Virginis . . .	6.0	12	32	18.420	-0.0021	5	21	9.06	-0.027
319	B. Virginis . . .	6.3	12	43	3.564	-0.0003	-5	49	32.70	-0.053

568 STARS OCCULTED BY THE MOON, 1913.

MEAN PLACES FOR 1913.0. (January 0^d.248, Washington.)

MEAN PLACES FOR 1913.0. (January 0^d.248, Washington.)

Name of Star.		Magni- tude.	Right Ascension.			Annual Proper Motion.	Declination.			Annual Proper Motion.
			h	m	s	s	°	'	"	"
	C. D.—28° 14268	6.4	18	6	26.389	−0.0002	−28	55	15.25	−0.019
48	G. Sagittarii . . .	6.3	18	11	52.946	+0.0093	28	19	1.61	−0.234
62	B. Sagittarii . . .	6.0	18	11	53.410	+0.0053	28	40	55.11	+0.032
δ	Sagittarii . . .	2.8	18	15	25.460	+0.0023	29	51	57.63	−0.034
58	G. Sagittarii . . .	6.1	18	16	29.911	+0.0028	28	28	13.04	+0.005
φ	Sagittarii . . .	3.3	18	40	13.269	+0.0034	−27	4	51.82	−0.006
τ	Sagittarii . . .	3.5	19	1	30.582	−0.0046	27	47	54.44	−0.254
183	B. Sagittarii . . .	6.2	19	2	2.327	+0.0024	28	46	17.97	−0.009
201	B. Sagittarii . . .	5.9	19	7	52.213	−0.0015	26	3	12.68	−0.018
234	B. Sagittarii . . .	5.9	19	19	4.806	−0.0013	28	2	4.43	+0.017
248	B. Sagittarii . . .	5.7	19	24	29.395	+0.0017	−27	9	50.74	−0.014
h	Sagittarii . . .	4.7	19	31	24.846	+0.0044	25	4	35.26	−0.027
308	B. Sagittarii . . .	6.3	19	49	5.288	−0.0094	24	9	29.89	−0.438
ω	Sagittarii . . .	4.8	19	50	30.719	+0.0145	26	31	51.59	+0.080
λ	Sagittarii . . .	4.9	19	53	39.238	+0.0013	26	25	54.26	+0.036
36	B. Capricorni . . .	6.2	20	24	25.174	+0.0003	−22	40	50.39	−0.027
56	B. Capricorni . . .	6.3	20	35	1.300	+0.0376	24	5	32.93	+0.462
17	Capricorni . . .	5.8	20	41	7.492	+0.0011	21	49	51.05	−0.014
20	Capricorni . . .	6.2	20	54	39.661	+0.0012	19	22	23.50	−0.020
η	Capricorni . . .	4.8	20	59	27.354	−0.0025	20	11	59.18	−0.047
χ	Capricorni . . .	5.3	21	3	34.769	+0.0013	−21	32	37.48	−0.059
27	Capricorni . . .	6.1	21	4	34.696	+0.0085	20	54	22.66	−0.123
φ	Capricorni . . .	5.3	21	10	40.891	0.0000	21	0	48.05	0.000
30	Capricorni . . .	5.4	21	13	4.703	+0.0015	18	21	0.79	−0.002
31	Capricorni . . .	6.3	21	13	23.730	+0.0031	17	49	39.93	+0.006
128	B. Capricorni . . .	6.5	21	25	6.733	+0.0019	−19	31	40.00	−0.027
γ	Capricorni . . .	3.8	21	35	16.368	+0.0129	17	3	20.57	−0.018
45	Capricorni . . .	5.8	21	39	16.089	−0.0013	15	8	55.07	−0.002
δ	Capricorni . . .	3.0	21	42	14.441	+0.0176	16	31	21.23	−0.297
152	B. Capricorni . . .	6.5	21	45	25.919	−0.0004	17	15	5.04	−0.054
ι	Aquarii . . .	4.4	22	1	44.392	+0.0022	−14	17	31.91	−0.062
39	Aquarii . . .	6.2	22	7	44.369	+0.0016	14	37	21.57	−0.044
42	Aquarii . . .	5.5	22	12	8.672	+0.0010	13	15	56.38	+0.009
45	Aquarii . . .	6.1	22	14	20.690	+0.0051	13	44	27.12	−0.002
50	Aquarii . . .	5.9	22	19	47.561	+0.0034	13	58	14.49	+0.013
182	B. Aquarii . . .	6.2	22	25	22.533	+0.0129	−13	21	39.74	−0.019
σ	Aquarii . . .	4.9	22	26	2.682	0.0000	11	7	24.32	−0.026
58	Aquarii . . .	6.4	22	27	4.671	+0.0050	11	21	5.82	−0.032
213	B. Aquarii . . .	6.5	22	38	29.989	+0.0014	8	46	0.97	+0.031
70	Aquarii . . .	6.1	22	43	55.668	+0.0035	11	0	54.48	+0.010
λ	Aquarii . . .	3.8	22	48	4.589	+0.0002	−8	2	34.12	+0.035
78	Aquarii . . .	6.3	22	50	2.330	−0.0017	7	40	2.25	−0.029
81	Aquarii . . .	6.4	22	56	52.399	−0.0015	7	31	42.55	−0.001
82	Aquarii . . .	6.4	22	58	1.660	0.0000	7	2	29.00	−0.034
h	Aquarii . . .	5.4	23	0	37.622	+0.0081	8	9	48.49	+0.016
φ	Aquarii . . .	4.4	23	9	49.021	+0.0015	−6	31	5.56	−0.194
χ	Aquarii . . .	5.3	23	12	20.410	−0.0015	8	12	4.15	−0.014
96	Aquarii . . .	5.7	23	14	53.328	+0.0128	5	35	59.29	−0.010
316	B. Aquarii . . .	6.5	23	15	45.234	+0.0191	4	23	34.98	−0.118
317	B. Aquarii . . .	6.3	23	16	11.833	−0.0099	6	22	59.58	−0.065
337	B. Aquarii . . .	6.4	23	25	2.236	+0.0121	−5	0	23.73	−0.218
342	B. Aquarii . . .	6.5	23	27	1.926	+0.0124	4	33	46.00	−0.172
20	Piscium . . .	5.6	23	43	28.220	+0.0064	3	14	43.26	+0.002
60	B. Piscium . . .	6.0	23	50	19.441	−0.0023	−0	22	28.52	−0.013

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Par- allels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"								
621 B. Virginis	6.4	-0.71	-0.4	-14 33.2	0 21 55.8	+ 2 38.7	+0.0601	0.5256	-0.2418	+43	-41
214 G. Virginis	6.5	0.73	+0.1	15 55.2	22 17.5	+ 2 59.7	+1.4009	0.5258	0.2413	+75	+60
40 H. Virginis	5.1	0.76	-0.2	15 53.5	1 0 58.9	+ 5 36.0	+0.7269	0.5267	0.2378	+75	- 6
43 B. Libræ	5.7	1.03	0.8	21 1.5	22 49.5	+ 2 43.8	+1.2891	0.5360	0.2037	+69	+40
47 G. Libræ	6.1	1.08	1.0	21 41.6	2 3 0.4	+ 6 46.4	+1.1625	0.5380	0.1960	+69	+26
64 G. Libræ	5.8	-1.13	-1.4	-22 4.7	7 33.0	+11 9.8	+0.6992	0.5401	-0.1875	+68	- 6
169 B. Libræ	6.0	1.23	2.2	22 51.2	17 13.3	- 3 29.7	-0.1966	0.5448	0.1678	+21	-56
177 B. Libræ	6.2	1.24	2.2	22 52.0	17 55.2	- 2 49.2	-0.2998	0.5451	0.1664	+16	-62
42 Libræ	5.0	1.25	2.1	23 32.2	18 19.4	- 2 25.8	+0.3464	0.5454	0.1654	+49	-25
A Scorpïi	4.6	1.30	2.5	25 4.1	3 0 14.4	+ 3 16.8	+1.0397	0.5480	0.1522	+65	+18
31 B. Scorpïi	5.4	-1.28	-2.7	-24 16.5	0 22.7	+ 3 24.9	+0.1719	0.5481	-0.1519	+38	-35
32 B. Scorpïi	5.3	1.28	2.8	23 43.2	0 24.1	+ 3 26.3	-0.4242	0.5481	0.1519	+ 8	-71
3 Scorpïi	5.9	1.30	2.5	24 59.2	0 42.3	+ 3 43.8	+0.8825	0.5482	0.1511	+66	+ 6
40 B. Scorpïi	5.4	1.31	2.8	24 34.9	2 26.8	+ 5 24.7	+0.1893	0.5490	0.1473	+39	-34
48 B. Scorpïi	4.9	1.34	2.8	25 37.5	4 32.2	+ 7 25.6	+1.0005	0.5500	0.1424	+65	+15
50 B. Scorpïi	6.4	-1.32	-3.1	-24 29.3	4 48.1	+ 7 41.0	-0.2522	0.5501	-0.1419	+16	-59
24 G. Scorpïi	6.2	1.33	3.3	24 13.8	6 32.7	+ 9 22.0	-0.7718	0.5508	0.1381	-12	-90
65 B. Scorpïi	5.5	1.36	2.9	26 5.7	6 37.5	+ 9 26.6	+1.2114	0.5509	0.1378	+64	+35
41 G. Scorpïi	6.3	1.35	3.6	24 12.1	9 7.8	+11 51.6	-1.1537	0.5519	0.1317	-39	-90
85 B. Scorpïi	6.0	1.37	3.5	25 15.5	9 36.6	-11 40.6	-0.0851	0.5521	0.1306	+23	-49
σ Scorpïi	3.1	-1.39	-3.8	-25 23.2	12 21.5	- 9 1.6	-0.2985	0.5531	-0.1238	+11	-63
α Scorpïi	1.2	1.43	4.0	26 14.5	15 55.2	- 5 35.4	+0.1920	0.5545	0.1153	+36	-33
22 Scorpïi	4.8	1.41	4.3	24 55.5	16 17.3	- 5 14.1	-1.2624	0.5546	0.1142	-53	-90
116 B. Scorpïi	6.2	1.44	4.0	26 21.0	16 46.5	- 4 45.9	+0.2118	0.5548	0.1130	+37	-32
134 B. Scorpïi	6.4	1.46	4.5	27 17.7	22 20.4	+ 0 36.0	+0.6366	0.5566	0.0990	+60	- 8
118 B. Ophiuchi	6.2	-1.49	-5.7	-26 23.9	4 8 3.4	+ 9 58.0	-1.1730	0.5591	-0.0738	-46	-90
95 G. Ophiuchi	6.1	1.52	5.8	27 39.4	10 24.0	-11 46.4	+0.0210	0.5594	0.0677	+23	-43
43 Ophiuchi	5.4	1.55	6.3	28 3.7	15 3.7	- 7 16.9	+0.1723	0.5601	-0.0551	+28	-35
NEW MOON.											
η Capricorni	4.8	-1.14	-11.9	-20 12.2	8 18 24.2	- 7 21.6	-1.3059	0.5191	+0.1808	-49	-90
χ Capricorni	5.3	1.12	12.0	21 32.8	20 27.5	- 5 22.1	+0.5589	0.5178	0.1840	+64	-14
27 Capricorni	6.1	1.12	11.9	20 54.6	20 57.4	- 4 53.2	-0.0557	0.5174	0.1847	+31	-47
φ Capricorni	5.3	1.10	12.0	21 1.0	9 0 1.3	- 1 54.9	+0.6374	0.5154	0.1894	+68	-10
128 B. Capricorni	6.5	1.04	11.7	19 31.9	7 21.9	+ 5 12.5	+0.4230	0.5105	0.2004	+59	-22
γ Capricorni	3.8	-1.01	-11.2	-17 3.5	12 36.9	+10 18.2	-1.2497	0.5072	+0.2073	-36	-90
δ Capricorni	3.0	0.98	11.0	16 31.5	16 15.3	-10 9.7	-1.0780	0.5049	0.2120	-21	-90
152 B. Capricorni	6.5	0.96	11.1	17 15.3	17 55.9	- 8 32.1	+0.0889	0.5039	0.2142	+42	-40
ι Aquarii	4.4	0.91	10.3	14 17.7	10 2 36.0	- 0 6.9	-1.2978	0.4991	0.2238	-39	-90
39 Aquarii	6.2	0.88	10.3	14 37.5	5 49.8	+ 3 1.5	-0.2012	0.4973	0.2273	+30	-56
42 Aquarii	5.5	-0.86	-9.9	-13 16.1	8 12.8	+ 5 20.4	-1.1633	0.4961	+0.2297	-25	-90
45 Aquarii	6.1	0.84	9.9	13 44.6	9 24.6	+ 6 30.2	-0.3602	0.4955	0.2308	+22	-65
50 Aquarii	5.9	0.82	9.9	13 58.4	12 22.8	+ 9 23.4	+0.5857	0.4941	0.2335	+74	-14
182 B. Aquarii	6.2	0.80	9.6	13 21.8	15 26.5	-11 38.0	+0.6282	0.4927	0.2363	+76	-12
58 Aquarii	6.4	0.80	9.1	11 21.2	16 22.7	-10 43.3	-1.3823	0.4923	0.2370	-48	-90
70 Aquarii	6.1	-0.73	-8.6	-11 1.1	11 1 43.7	- 1 37.5	+0.4972	0.4886	+0.2442	+70	-19
h Aquarii	5.4	0.67	7.4	8 9.9	11 6.8	+ 7 30.4	-0.3447	0.4856	0.2502	+26	-64
φ Aquarii	4.4	0.64	6.6	6 31.2	16 19.1	-11 25.6	-0.8578	0.4843	0.2530	0	-90
χ Aquarii	5.3	0.61	7.1	8 12.2	17 45.1	-10 1.9	+1.3706	0.4839	0.2538	+82	+41
96 Aquarii	5.7	0.63	6.3	5 36.1	19 12.1	- 8 37.2	-1.1437	0.4836	0.2545	-18	-90
317 B. Aquarii	6.3	-0.62	-6.4	- 6 23.1	19 56.8	- 7 53.7	-0.0862	0.4835	+0.2548	+39	-49
337 B. Aquarii	6.4	0.58	5.7	5 0.5	12 0 59.3	- 2 59.2	-0.3206	0.4828	0.2566	+28	-62
342 B. Aquarii	6.5	0.58	5.5	4 33.9	2 7.6	- 1 52.8	-0.5189	0.4826	0.2571	+18	-75
20 Piscium	5.6	0.50	4.6	3 14.8	11 31.9	+ 7 16.6	+0.4580	0.4820	0.2598	+71	-21
80 B. Piscium	6.3	0.44	3.3	0 59.2	21 20.0	- 7 10.8	+0.5217	0.4822	0.2614	+76	-18
98 B. Piscium	6.3	-0.39	-2.1	+ 1 12.3	13 4 35.2	- 0 7.0	+0.0089	0.4831	+0.2618	+45	-44

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"								
44 Piscium	6.0	-0.35	- 1.7	+ 1 27.4	13 8 54.8	+ 4 5.7	+0.8630	0.4839	+0.2616	+90	0
60 Piscium	6.2	0.29	+ 0.8	6 16.0	21 15.9	- 7 53.2	-1.1790	0.4876	0.2597	-22	-84
147 B. Piscium	5.9	0.27	0.3	4 50.0	21 46.8	- 7 23.1	+0.5200	0.4878	0.2595	+75	-18
171 B. Piscium	6.3	0.21	1.2	6 0.9	14 4 9.6	- 1 10.8	+0.8810	0.4904	0.2576	+90	+ 1
ε Piscium	4.4	0.20	1.8	7 25.3	5 52.4	+ 0 29.2	-0.2111	0.4911	0.2570	+34	-55
π Piscium	5.6	-0.05	+ 4.5	+11 41.9	15 0 13.6	- 5 40.7	-0.2043	0.5017	+0.2470	+34	-53
19 Arietis	5.8	+0.15	6.7	14 52.5	18 36.1	-11 50.9	+0.7907	0.5158	0.2311	+90	+ 1
27 Arietis	6.4	0.23	8.0	17 19.3	16 3 19.6	- 3 23.9	+0.1566	0.5239	0.2206	+53	-30
μ Arietis	5.7	0.29	9.1	19 38.6	8 46.4	+ 1 52.4	-1.1184	0.5291	0.2135	-21	-71
40 Arietis	6.0	0.34	8.6	17 55.5	11 41.6	+ 4 41.9	+1.3164	0.5320	0.2091	+90	+46
47 Arietis	5.8	+0.39	+ 9.6	+20 19.4	16 5.2	+ 8 56.8	-0.3082	0.5366	+0.2024	+28	-51
ε Arietis (mean)	4.6	0.40	9.8	20 59.7	16 36.4	+ 9 27.0	-0.9108	0.5371	0.2017	- 6	-70
ζ Arietis	5.0	0.49	9.9	20 43.5	23 42.8	- 7 41.1	+0.7661	0.5446	0.1894	+90	+ 6
τ Arietis	5.2	0.53	10.0	20 50.2	17 2 31.1	- 4 58.7	+1.1727	0.5478	0.1841	+90	+35
66 Arietis	6.1	0.57	10.6	22 30.5	5 39.8	- 1 56.7	-0.0017	0.5512	0.1784	+44	-32
7 Tauri	5.9	+0.61	+11.2	+24 10.6	8 14.7	+ 0 32.8	-1.2856	0.5541	+0.1731	-43	-66
16 Tauri	5.4	0.68	11.2	24 1.2	12 40.8	+ 4 49.3	-0.3717	0.5589	0.1636	+24	-50
17 Tauri	3.8	0.68	11.1	23 50.6	12 42.8	+ 4 51.2	-0.1836	0.5590	0.1634	+34	-39
18 Tauri	5.6	0.68	11.4	24 34.2	12 49.5	+ 4 57.6	-0.9194	0.5592	0.1631	- 8	-66
q Tauri	4.3	0.68	11.2	24 11.9	12 51.0	+ 4 59.1	-0.5293	0.5592	0.1631	+15	-58
20 Tauri	4.1	+0.68	+11.2	+24 6.0	13 6.8	+ 5 14.3	-0.3839	0.5594	+0.1626	+23	-50
21 Tauri	5.8	0.68	11.3	24 17.2	13 8.6	+ 5 16.1	-0.5729	0.5594	0.1626	+13	-61
22 Tauri	6.5	0.68	11.3	24 15.6	13 12.2	+ 5 19.5	-0.5354	0.5595	0.1623	+15	-58
23 Tauri	4.3	0.69	11.1	23 40.9	13 19.8	+ 5 26.8	+0.0859	0.5597	0.1621	+49	-26
7 Tauri	3.0	0.69	11.1	23 50.4	13 49.1	+ 5 55.1	+0.0003	0.5602	0.1610	+44	-30
104 B. Tauri	5.5	+0.70	+10.9	+23 9.5	14 11.5	+ 6 16.6	+0.7679	0.5606	+0.1602	+90	+10
27 Tauri	3.7	0.70	11.1	23 47.5	14 31.6	+ 6 36.0	+0.1644	0.5610	0.1594	+54	-22
28 Tauri	5.2	0.70	11.2	23 52.5	14 32.1	+ 6 36.5	+0.0795	0.5610	0.1594	+49	-26
36 Tauri	5.6	0.79	11.1	23 52.2	20 51.2	-11 18.6	+1.0462	0.5680	0.1448	+90	+29
p Tauri	5.6	0.84	11.8	26 15.5	23 28.1	- 8 47.5	-1.0447	0.5707	0.1384	-18	-64
χ Tauri	5.3	+0.91	+11.5	+25 25.7	18 4 13.5	- 4 13.1	+0.4410	0.5758	+0.1262	+73	- 4
17 B. Aurigæ	6.0	1.10	11.7	27 45.4	16 2.6	+ 7 7.8	-0.6356	0.5875	0.0929	+ 8	-59
38 B. Aurigæ	6.5	1.17	11.4	27 34.7	20 34.8	+11 29.0	-0.0615	0.5914	0.0796	+41	-25
47 B. Aurigæ	6.0	1.20	11.4	27 55.5	22 30.8	-10 39.8	-0.2645	0.5930	0.0735	+29	-35
354 B. Tauri	6.4	1.26	11.0	27 52.4	19 2 44.6	- 6 36.5	+0.0716	0.5964	0.0598	+49	-17
22 Aurigæ	6.4	+1.28	+11.2	+28 51.5	3 37.3	- 5 46.1	-0.8722	0.5970	+0.0571	- 7	-62
β Tauri	1.8	1.30	11.0	28 32.3	4 42.7	- 4 43.4	-0.4879	0.5979	0.0537	+17	-47
107 B. Aurigæ	6.5	1.33	10.5	27 36.6	8 18.0	- 1 17.2	+0.6209	0.6004	0.0419	+90	+14
116 B. Aurigæ	5.9	1.37	10.8	29 10.1	9 31.3	- 0 7.0	-0.9012	0.6011	0.0378	- 9	-61
406 B. Tauri	5.6	1.41	10.1	27 56.7	13 49.3	+ 4 0.0	+0.4613	0.6035	0.0231	+75	+ 7
136 Tauri	4.6	+1.42	+10.0	+27 35.7	14 41.4	+ 4 49.8	+0.8318	0.6040	+0.0203	+90	+27
154 B. Aurigæ	6.4	1.45	10.1	28 55.9	15 51.0	+ 5 56.4	-0.4884	0.6046	0.0162	+17	-45
415 B. Tauri	6.1	1.46	9.7	27 34.3	17 29.4	+ 7 30.6	+0.8980	0.6056	0.0105	+90	+32
183 B. Aurigæ	6.3	1.51	9.9	29 31.4	19 24.4	+ 9 20.7	-1.0423	0.6065	+0.0039	-21	-61
κ Aurigæ	4.4	1.55	9.5	29 32.0	22 40.2	-11 32.1	-1.0566	0.6074	-0.0075	-22	-61
211 B. Aurigæ	6.3	+1.57	+ 9.2	+29 35.0	20 0 46.0	- 9 31.7	-1.1282	0.6079	-0.0147	-29	-61
49 Aurigæ	5.1	1.60	8.3	28 5.6	5 50.1	- 4 40.7	+0.2386	0.6093	0.0324	+59	- 6
53 Aurigæ	5.6	1.63	8.3	29 3.7	6 57.8	- 3 36.1	-0.7644	0.6096	0.0366	0	-61
54 Aurigæ	5.8	1.62	8.2	28 20.6	7 23.7	- 3 11.3	-0.0652	0.6096	0.0379	+41	-22
28 Geminorum	5.5	1.65	8.0	29 3.7	9 15.3	- 1 24.6	-0.8564	0.6096	0.0446	- 6	-61
47 Geminorum	5.6	+1.70	+ 6.4	+27 0.1	18 51.6	+ 7 46.6	+0.5950	0.6094	-0.0784	+88	+ 9
53 Geminorum	5.9	1.74	6.3	28 3.1	20 29.4	+ 9 20.2	-0.5750	0.6089	0.0841	+12	-54
134 B. Geminorum	6.5	1.72	6.1	26 50.9	20 54.2	+ 9 43.8	+0.5789	0.6088	0.0853	+86	+ 8
59 Geminorum	5.7	1.75	5.8	27 48.5	23 35.9	-11 41.5	-0.6124	0.6080	0.0942	+10	-58
ι Geminorum	3.9	1.76	5.7	27 58.4	21 0 1.5	-11 17.1	-0.8156	0.6079	0.0959	- 3	-63
β ¹ Geminorum	5.0	+1.77	+ 5.6	+28 18.0	1 19.5	-10 2.5	-1.2653	0.6075	-0.1003	-47	- 2

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	°	d h m	h m				°	'
b ² Geminorum	5.0	+1.77	+ 5.5	+28 5.9	21 1 29.9	- 9 52.5	-1.0834	0.6074	-0.1007	-23	-62
v Geminorum	4.3	1.76	5.1	27 5.5	3 43.7	- 7 44.5	-0.3237	0.6067	0.1084	+26	-41
c Geminorum	5.5	1.76	4.5	25 59.6	6 43.4	- 4 52.5	+0.4180	0.6058	0.1186	+71	- 4
φ Geminorum	5.0	1.79	4.0	26 59.6	10 8.5	- 1 36.2	-0.9899	0.6041	0.1292	-15	-64
ω Cancri	5.9	1.77	3.5	25 38.0	12 53.4	+ 1 1.6	-0.0199	0.6026	0.1378	+43	-27
4 Cancri	6.2	+1.77	+ 3.5	+25 19.8	13 11.4	+ 1 18.9	+0.2355	0.6024	-0.1389	+59	-15
ψ Cancri	5.9	1.78	3.0	25 46.4	16 24.6	+ 4 23.9	-0.6639	0.6007	0.1491	+ 7	-65
λ Cancri	5.9	1.77	2.3	24 17.9	20 10.9	+ 8 0.6	+0.2010	0.5985	0.1603	+56	-19
28 Cancri	6.1	1.78	1.8	24 26.1	23 12.6	+10 54.7	-0.4333	0.5963	0.1687	+21	-53
v ¹ Cancri	5.7	1.78	1.7	24 22.5	22 0 18.2	+11 57.6	-0.5621	0.5955	0.1717	+14	-60
v ² Cancri	6.4	+1.78	+ 1.6	+24 22.9	0 52.0	-11 30.0	-0.6656	0.5951	-0.1734	+ 8	-65
γ Cancri	4.7	1.73	+ 0.9	21 46.9	4 48.2	- 7 43.5	+1.1765	0.5923	0.1845	+90	+36
90 H ¹ . Cancri	6.1	1.70	- 0.9	21 38.5	16 33.7	+ 3 33.5	-1.0361	0.5829	0.2136	-15	-69
107 B. Leonis	6.3	1.52	3.5	16 10.8	22 13 46.3	- 0 2.7	-0.6805	0.5648	0.2537	+ 9	-74
34 Leonis	6.4	1.47	3.5	13 47.0	16 17.4	+ 2 22.8	+1.0259	0.5626	0.2577	+90	+15
37 Leonis	5.5	+1.46	- 3.8	+14 9.7	18 25.6	+ 4 26.3	+0.1015	0.5609	-0.2609	+50	-35
l Leonis	5.3	1.33	5.1	11 0.3	24 8 33.3	- 5 56.4	-0.6005	0.5501	0.2764	+13	-76
χ Leonis	4.7	1.23	5.2	7 48.3	15 35.8	+ 0 51.4	+0.5883	0.5453	0.2816	+81	-13
308 B. Leonis	5.8	1.23	5.9	8 32.1	19 38.5	+ 4 45.8	-1.2800	0.5427	0.2843	-31	-82
6 Leonis	4.1	1.17	5.8	6 30.3	22 52.9	+ 7 53.6	-0.1944	0.5409	0.2855	+34	-55
80 Leonis	6.4	+1.12	- 5.4	+ 4 20.3	25 1 1.9	+ 9 58.3	+1.3391	0.5397	-0.2863	+90	+36
89 Leonis	5.7	1.08	5.6	3 32.5	4 57.4	-10 14.1	+1.0023	0.5376	0.2878	+90	+ 8
β Virginis	3.8	0.99	6.0	2 15.2	12 29.6	- 2 56.9	+0.1111	0.5341	0.2887	+50	-39
27 B. Virginis	6.5	0.94	5.9	+ 1 0.8	16 26.6	+ 0 52.3	+0.2071	0.5325	0.2889	+56	-34
13 Virginis	5.9	0.86	6.5	- 0 18.3	26 1 41.5	+ 9 49.1	-1.1434	0.5296	0.2871	-17	-90
200 B. Virginis	6.3	+0.75	- 5.7	- 4 34.5	7 51.0	- 8 13.4	+1.3883	0.5281	-0.2851	+86	+43
319 B. Virginis	6.3	0.66	5.8	5 49.6	15 26.2	- 0 52.9	+0.5096	0.5271	0.2808	+75	-18
g Virginis	5.6	0.55	5.8	8 31.2	27 1 27.8	+ 8 49.5	+0.4634	0.5265	0.2733	+70	-21
α Virginis	1.2	0.44	5.6	10 42.5	9 24.6	- 7 29.0	+0.5544	0.5268	0.2660	+74	-16
86 Virginis	5.6	0.35	5.9	11 59.5	19 16.9	+ 2 4.3	-0.7039	0.5280	0.2552	+ 5	-90
214 G. Virginis	6.5	+0.21	- 5.1	-15 55.3	28 4 22.6	+10 52.2	+1.0867	0.5300	-0.2430	+75	+17
40 H. Virginis	5.1	+0.18	5.3	15 53.6	7 1.0	-10 34.5	+0.4214	0.5305	0.2394	+62	-22
43 B. Libræ	5.7	-0.07	5.1	21 1.5	29 4 33.1	+10 14.8	+1.0032	0.5375	0.2032	+69	+13
47 G. Libræ	6.1	0.13	4.9	21 41.7	8 41.6	- 9 45.0	+0.8833	0.5390	0.1955	+69	+ 5
64 G. Libræ	5.8	0.18	5.1	22 4.8	13 12.0	- 5 23.7	+0.4284	0.5407	0.1863	+55	-21
153 B. Libræ	6.3	-0.25	- 4.9	-24 11.8	20 43.1	+ 1 51.9	+1.3256	0.5436	-0.1710	+66	+53
169 B. Libræ	6.0	0.26	5.5	22 51.3	22 49.1	+ 3 53.5	-0.4504	0.5444	0.1662	+ 8	-73
177 B. Libræ	6.2	0.27	5.6	22 52.1	23 30.8	+ 4 33.9	-0.5523	0.5446	0.1646	+ 2	-81
42 Libræ	5.0	0.28	5.4	23 32.2	23 54.9	+ 4 57.1	+0.0926	0.5447	0.1638	+35	-39
A Scorpii	4.6	0.36	5.2	25 4.2	30 5 48.9	+10 38.8	+0.7938	0.5469	0.1508	+65	0
31 B. Scorpii	5.4	-0.36	- 5.5	-24 16.6	5 57.2	+10 46.8	-0.0719	0.5469	-0.1505	+26	-49
32 B. Scorpii	5.3	0.35	5.7	23 43.3	5 58.6	+10 48.2	-0.6670	0.5470	0.1503	- 5	-90
3 Scorpii	5.9	0.37	5.3	24 59.3	6 16.7	+11 5.6	+0.6374	0.5471	0.1497	+64	- 9
40 B. Scorpii	5.4	0.38	5.5	24 35.0	8 1.1	-11 13.7	-0.0512	0.5477	0.1455	+26	-47
π Scorpii	3.0	0.40	5.1	25 52.0	8 7.1	-11 7.9	+1.3029	0.5477	0.1455	+65	+51
48 B. Scorpii	4.9	-0.42	- 5.3	-25 37.5	10 6.3	- 9 12.8	+0.7619	0.5484	-0.1407	+65	- 2
50 B. Scorpii	6.4	0.41	5.7	24 29.3	10 22.2	- 8 57.5	-0.4883	0.5485	0.1401	+ 3	-77
24 G. Scorpii	6.2	0.42	5.9	24 13.9	12 6.8	- 7 16.5	-1.0042	0.5491	0.1358	-26	-90
65 B. Scorpii	5.5	0.44	5.3	26 5.7	12 11.6	- 7 11.9	+0.9761	0.5491	0.1358	+64	+13
85 B. Scorpii	6.0	0.47	5.7	25 15.5	15 10.6	- 4 19.2	-0.3135	0.5501	0.1287	+11	-64
6 Scorpii	3.1	-0.50	- 5.9	-25 23.2	17 55.7	- 1 40.0	-0.5219	0.5510	-0.1221	0	-80
α Scorpii	1.2	0.50	5.9	26 14.5	21 29.8	+ 1 46.5	-0.0259	0.5520	0.1131	+24	-46
116 B. Scorpii	6.2	0.51	5.9	26 21.0	22 21.2	+ 2 36.2	-0.0048	0.5522	0.1110	+25	-45
134 B. Scorpii	6.4	0.58	6.0	27 17.7	31 3 56.2	+ 7 59.1	+0.4302	0.5537	0.0968	+47	-20
95 G. Ophiuchi	6.1	0.69	6.6	27 39.4	16 3.2	- 4 20.0	-0.1635	0.5560	0.0652	+12	-54
43 Ophiuchi	5.4	-0.70	- 6.9	-28 3.7	20 44.7	+ 0 11.4	-0.0033	0.5565	-0.0527	+20	-45

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
G. Ophiuchi	6.3	-0.77	-7.4	-27 50.7	1 5 18.3	+8 26.6	-0.5927	0.5568	-0.0297	-13	-88
Sagittarii (<i>var.</i>)	4.4	0.78	7.5	27 48.0	7 8.2	+10 12.5	-0.6915	0.5569	0.0249	-19	-90
G. Sagittarii	5.7	0.81	7.7	28 3.2	11 3.4	-10 0.8	-0.4929	0.5565	0.0142	-9	-78
B. Scorpii	5.8	0.82	7.6	28 45.1	11 53.1	-9 12.8	+0.2570	0.5564	0.0119	+30	-30
Sagittarii (<i>var.</i>)	4.3	0.82	7.5	29 35.2	14 36.6	-6 35.2	+1.1455	0.5562	0.0045	+61	+31
B. Sagittarii	4.7	-0.85	-7.9	-28 28.2	15 57.0	-5 17.8	-0.0773	0.5561	-0.0010	+11	-49
C. D.-28° 14268	6.4	0.86	7.9	28 55.4	17 37.0	-3 41.3	+0.4200	0.5559	+0.0036	+39	-21
G. Sagittarii	6.3	0.87	8.1	28 19.2	19 58.0	-1 25.4	-0.2237	0.5556	0.0097	+4	-58
B. Sagittarii	6.0	0.88	8.0	28 41.1	19 58.2	-1 25.2	+0.1751	0.5556	0.0097	+25	-35
G. Sagittarii	6.1	0.86	8.2	28 28.4	21 57.8	+0 30.1	-0.0316	0.5551	0.0151	+15	-46
Sagittarii	3.3	-0.90	-9.0	-27 5.0	2 8 16.6	+10 26.9	-1.2572	0.5526	+0.0424	-58	-90
Sagittarii	3.5	0.94	9.3	27 48.1	17 38.5	-4 31.0	+0.0394	0.5492	0.0664	+23	-42
B. Sagittarii	6.2	0.95	9.1	28 46.5	17 52.5	-4 17.5	+1.1254	0.5491	0.0670	+62	+28
B. Sagittarii	5.9	0.94	9.5	28 2.2	3 1 28.3	+3 2.5	+0.8968	0.5458	0.0855	+62	+9
B. Sagittarii	5.7	0.95	9.7	27 10.0	3 54.2	+5 23.4	+0.1534	0.5447	0.0913	+31	-36
NEW MOON.											
Aquarii	6.4	-0.78	-7.9	-7 31.8	7 15 29.4	-10 16.2	-1.4044	0.4871	+0.2513	-48	-90
Aquarii	5.4	0.76	7.9	8 9.9	17 36.6	-8 12.3	-0.1645	0.4864	0.2527	+35	-53
Aquarii	4.4	0.75	7.3	6 31.2	22 49.1	-3 8.2	-0.6690	0.4851	0.2551	+10	-88
Aquarii	5.7	-0.74	-7.0	-5 36.1	8 1 42.2	-0 19.6	-0.9502	0.4845	+0.2564	-5	-90
B. Aquarii	6.3	0.73	7.1	6 23.1	2 26.9	+0 23.9	+0.1114	0.4844	0.2567	+50	-39
B. Aquarii	6.4	0.72	6.6	5 0.5	7 29.7	+5 18.7	-0.1150	0.4833	0.2589	+39	-51
B. Aquarii	6.5	0.72	6.4	4 33.9	8 38.2	+6 25.4	-0.3120	0.4832	0.2592	+29	-62
Piscium	5.6	0.67	5.6	3 14.8	18 3.5	-8 24.2	+0.6828	0.4822	0.2617	+87	-10
B. Piscium	6.3	-0.64	-4.4	-0 59.2	9 3 53.6	+1 10.3	+0.7609	0.4822	+0.2627	+90	-5
B. Piscium	6.3	0.61	3.4	+1 12.3	11 10.8	+8 16.0	+0.2549	0.4828	0.2627	+58	-32
Piscium	6.0	0.58	3.0	1 27.4	15 31.8	-11 29.8	+1.1184	0.4834	0.2624	+90	+15
VENUS	-4.0	.....	.....	4 9.9	19 5.0	-8 2.4	-0.9392	0.4443	0.2400	-5	-86
Piscium	6.2	0.55	0.9	6 16.0	10 3 58.4	+0 36.9	-0.9243	0.4862	0.2598	-4	-84
Piscium	6.1	-0.55	-0.8	+6 49.5	4 28.2	+1 5.8	-1.4093	0.4863	+0.2597	-47	-84
B. Piscium	5.9	0.52	1.3	4 50.0	4 29.6	+1 7.2	+0.7863	0.4863	0.2597	+90	-4
B. Piscium	6.3	0.49	-0.4	6 0.8	10 56.1	+7 23.3	+1.1545	0.4884	0.2573	+90	+19
Piscium	4.4	0.49	+0.1	7 25.3	12 40.0	+9 4.4	+0.0554	0.4891	0.2566	+47	-41
Piscium	5.6	0.38	2.8	11 41.9	11 7 16.1	+3 9.4	+0.0681	0.4977	0.2460	+48	-39
Arietis	5.8	-0.22	+5.1	+14 52.4	12 1 59.2	-2 40.2	+1.0720	0.5104	+0.2285	+90	+19
Arietis	6.4	0.13	6.6	17 19.3	10 54.4	+5 58.7	+0.4270	0.5176	0.2179	+70	-16
Arietis	5.7	-0.08	7.8	19 38.6	16 29.2	+11 23.0	-0.8682	0.5223	0.2106	-3	-71
Arietis	5.8	+0.01	8.4	20 19.4	23 59.3	-5 21.3	-0.0528	0.5291	0.1991	+42	-38
Arietis (<i>mean</i>)	4.6	0.01	8.7	20 59.7	18 0 31.4	-4 50.2	-0.6639	0.5295	0.1983	+9	-70
Arietis	5.0	+0.12	+9.0	+20 43.5	7 49.7	+2 13.6	+1.0301	0.5363	+0.1863	+90	+23
Arietis	6.1	0.20	9.9	22 30.5	13 57.1	+8 8.5	+0.2452	0.5424	0.1747	+59	-20
Tauri	5.9	0.24	10.6	24 10.6	16 36.6	+10 42.5	-1.0602	0.5450	0.1697	-18	-66
Tauri	5.4	0.30	10.7	24 1.2	21 10.9	-8 52.7	-0.1379	0.5495	0.1603	+37	-36
Tauri	3.8	0.30	10.6	23 50.6	21 12.9	-8 50.8	+0.0530	0.5496	0.1601	+47	-28
Tauri	5.6	+0.30	+10.9	+24 34.2	21 19.8	-8 44.2	-0.6942	0.5497	+0.1598	+6	-66
Tauri	4.3	0.30	10.7	24 11.9	21 21.3	-8 42.7	-0.2983	0.5497	0.1598	+28	-46
Tauri	4.1	0.30	10.7	24 6.0	21 37.7	-8 26.9	-0.1510	0.5500	0.1593	+36	-37
Tauri	5.8	0.30	10.8	24 17.2	21 39.6	-8 25.0	-0.3427	0.5500	0.1593	+26	-48
Tauri	6.5	0.31	10.8	24 15.6	21 43.3	-8 21.5	-0.3049	0.5501	0.1590	+28	-46
Tauri	4.3	+0.31	+10.6	+23 40.9	21 51.1	-8 14.0	+0.3260	0.5502	+0.1587	+64	-13
Tauri	3.0	0.32	10.6	23 50.4	22 21.3	-7 44.8	+0.2384	0.5507	0.1577	+59	-18
B. Tauri	5.5	0.33	10.4	23 9.5	22 44.4	-7 22.6	+1.0170	0.5510	0.1569	+90	+25
Tauri	3.7	0.33	10.6	23 47.5	23 5.1	-7 2.6	+0.4043	0.5514	0.1561	+70	-10
Tauri	5.2	0.33	10.7	23 52.5	23 5.7	-7 2.0	+0.3178	0.5514	0.1561	+64	-13
I Tauri	5.3	+0.34	+11.2	+25 19.3	23 33.7	-6 35.0	-1.1310	0.5519	+0.1559	-25	-65

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.		
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.	
		Δα	Δδ									
		s	"	°	d	h	m	h	m		°	°
ρ Tauri	5.6	+0.48	+11.7	+26 15.5	14	8	18.6	+ 1 50.9	-0.8354	0.5606	+0.1352	- 3 -64
φ Tauri	5.0	0.55	12.0	27 8.8		12	16.4	+ 5 39.8	-1.2439	0.5644	0.1252	-41 -63
χ Tauri	5.3	0.57	11.5	25 25.7		13	13.3	+ 6 34.6	+0.6671	0.5653	0.1228	+90 + 8
17 B. Aurigæ	6.0	0.78	12.1	27 45.4	15	1	25.8	- 5 41.0	-0.4433	0.5766	0.0900	+20 -47
38 B. Aurigæ	6.5	0.87	11.9	27 34.7		6	6.9	- 1 10.9	+0.1326	0.5807	0.0767	+52 -15
47 B. Aurigæ	6.0	+0.91	+12.0	+27 55.5		8	6.7	+ 0 44.1	-0.0764	0.5822	+0.0710	+40 -25
354 B. Tauri	6.4	0.99	11.8	27 52.4		12	28.7	+ 4 55.6	+0.2578	0.5854	0.0574	+60 - 7
22 Aurigæ	6.4	1.01	12.1	28 51.5		13	23.1	+ 5 47.8	-0.7016	0.5861	0.0548	+ 4 -61
β Tauri	1.8	1.04	11.9	28 32.3		14	30.6	+ 6 52.6	-0.3133	0.5869	0.0511	+27 -36
107 B. Aurigæ	6.5	1.10	11.4	27 36.6		18	12.9	+10 25.8	+0.8061	0.5897	0.0396	+90 +24
116 B. Aurigæ	5.9	+1.12	+11.8	+29 10.1		19	28.4	+11 38.2	-0.7405	0.5904	+0.0358	+ 2 -61
406 B. Tauri	5.6	1.19	11.1	27 56.8		23	54.5	- 8 6.7	+0.6346	0.5928	0.0213	+90 +15
136 Tauri	4.6	1.20	11.0	27 35.7	16	0	48.2	- 7 15.3	+1.0090	0.5933	0.0185	+90 +38
154 B. Aurigæ	6.4	1.24	11.3	28 55.9		1	59.9	- 6 6.6	-0.3320	0.5939	0.0146	+26 -34
415 B. Tauri	6.1	1.26	10.7	27 34.3		3	41.3	- 4 29.4	+1.0708	0.5949	0.0086	+90 +43
183 B. Aurigæ	6.3	+1.31	+11.1	+29 31.4		5	39.8	- 2 35.8	-0.8997	0.5960	+0.0023	- 9 -61
κ Aurigæ	4.4	1.37	10.8	29 32.0		9	1.4	+ 0 37.3	-0.9194	0.5972	-0.0089	-11 -61
211 B. Aurigæ	6.3	1.41	10.6	29 35.1		11	10.8	+ 2 41.2	-0.9956	0.5979	0.0163	-17 -61
49 Aurigæ	5.1	1.48	9.6	28 5.6		16	23.4	+ 7 40.7	+0.3798	0.5995	0.0338	+69 + 1
53 Aurigæ	5.6	1.52	9.7	29 3.7		17	33.0	+ 8 47.3	-0.6377	0.5999	0.0378	+ 8 -55
54 Aurigæ	5.8	+1.51	+ 9.5	+28 20.6		17	59.6	+ 9 12.8	+0.0693	0.6000	-0.0395	+49 -15
28 Geminorum	5.5	1.54	9.5	29 3.7		19	54.2	+11 2.5	-0.7347	0.6004	0.0460	+ 2 -61
47 Geminorum	5.6	1.66	7.7	27 0.1	17	5	44.7	- 3 32.1	+0.7142	0.6009	0.0793	+90 +15
53 Geminorum	5.9	1.70	7.7	28 3.1		7	24.8	- 1 56.2	-0.4707	0.6009	0.0850	+18 -48
134 B. Geminorum	6.5	1.69	7.3	26 50.9		7	50.1	- 1 32.0	+0.6937	0.6008	0.0862	+90 +14
59 Geminorum	5.7	+1.74	+ 7.2	+27 48.5		10	35.4	+ 1 6.2	-0.5140	0.6003	-0.0952	+16 -52
i Geminorum	3.9	1.75	7.1	27 58.4		11	1.5	+ 1 31.2	-0.7201	0.6003	0.0968	+ 3 -63
b ¹ Geminorum	5.0	1.78	7.0	28 18.0		12	21.1	+ 2 47.4	-1.1760	0.6000	0.1012	-33 -62
b ² Geminorum	5.0	1.77	6.9	28 5.9		12	31.8	+ 2 57.8	-0.9929	0.6000	0.1016	-15 -62
v Geminorum	4.3	1.78	6.3	27 5.5		14	48.3	+ 5 8.4	-0.2309	0.5996	0.1091	+32 -36
c Geminorum	5.5	+1.80	+ 5.6	+25 59.6		17	51.4	+ 8 3.8	+0.5110	0.5991	-0.1193	+79 0
φ Geminorum	5.0	1.86	5.3	26 59.6		21	20.1	+11 23.7	-0.9147	0.5979	0.1303	- 9 -64
ω Cancrī	5.9	1.86	4.6	25 38.0	18	0	7.7	- 9 55.8	+0.0566	0.5968	0.1388	+48 -24
4 Cancrī	6.2	1.86	4.5	25 19.9		0	26.0	- 9 38.2	+0.3130	0.5967	0.1395	+64 -11
ψ Cancrī	5.9	1.90	4.0	25 46.4		3	42.1	- 6 30.3	-0.5983	0.5954	0.1499	+11 -61
λ Cancrī	5.9	+1.90	+ 3.1	+24 17.9		7	31.4	- 2 50.6	+0.2630	0.5938	-0.1615	+60 -16
28 Cancrī	6.1	1.93	2.6	24 26.1		10	35.2	+ 0 5.6	-0.3804	0.5922	0.1699	+24 -50
v ¹ Cancrī	5.7	1.94	2.4	24 22.5		11	41.6	+ 1 9.3	-0.5120	0.5916	0.1729	+17 -58
v ² Cancrī	6.4	1.94	2.3	24 22.9		12	15.7	+ 1 42.0	-0.6172	0.5912	0.1746	+11 -63
γ Cancrī	4.7	1.92	+ 1.2	21 46.9		16	14.1	+ 5 30.7	+1.2218	0.5891	0.1856	+90 +40
90 H ¹ . Cancrī	6.1	+1.98	- 0.7	+21 38.5	19	4	3.2	- 7 8.6	-1.0200	0.5816	-0.2155	-14 -69
107 B. Leonis	6.3	1.93	4.6	16 10.8	20	1	11.4	-10 49.3	-0.7104	0.5672	0.2570	+ 7 -74
34 Leonis	6.4	1.88	5.0	13 47.0		3	41.0	- 8 25.3	+0.9813	0.5654	0.2611	+90 +12
37 Leonis	5.5	1.89	5.5	14 9.7		5	47.7	- 6 23.2	+0.0569	0.5640	0.2644	+48 -37
l Leonis	5.3	1.82	7.3	11 0.2		19	43.0	+ 7 1.6	-0.6707	0.5552	0.2814	+10 -79
χ Leonis	4.7	+1.76	- 8.1	+ 7 48.3	21	2	37.2	-10 19.0	+0.4911	0.5514	-0.2869	+74 -19
308 B. Leonis	5.8	1.75	8.6	8 32.1		6	34.4	- 6 30.0	-1.3655	0.5492	0.2900	-40 -82
6 Leonis	4.1	1.71	8.8	6 30.2		9	44.3	- 3 26.8	-0.2985	0.5478	0.2914	+29 -61
80 Leonis	6.4	1.67	8.8	4 20.2		11	50.1	- 1 25.4	+1.2120	0.5469	0.2922	+90 +23
89 Leonis	5.7	1.65	9.1	3 32.5		15	39.6	+ 2 16.3	+0.8710	0.5452	0.2937	+90 0
β Virginis	3.8	+1.62	- 9.9	+ 2 15.1		22	59.1	+ 9 20.7	-0.0232	0.5425	-0.2951	+43 -46
27 B. Virginis	6.5	1.58	10.0	+ 1 0.7	22	2	49.1	-10 57.0	+0.0646	0.5413	0.2952	+48 -41
13 Virginis	5.9	1.51	10.6	- 0 18.4		11	46.5	- 2 17.8	-1.2803	0.5390	0.2937	-28 -90
162 B. Virginis	6.2	1.44	10.2	4 8.2		15	59.5	+ 1 46.7	+1.2735	0.5382	0.2923	+86 +29
200 B. Virginis	6.3	1.43	10.3	4 34.5		17	43.8	+ 3 27.5	+1.2017	0.5378	0.2917	+86 +23
f Virginis	6.0	+1.42	-10.4	- 5 21.3		20	5.6	+ 5 44.6	+1.2883	0.5375	-0.2905	+85 +31

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS. FEBRUARY.

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MARCH.

G. Sagittarii	6.3	+0.03	-7.9	-28 19.2	1	1 50.1	+ 6 14.1	-0.3818	0.5549	+0.0107	- 4 -69
B. Sagittarii	6.0	0.03	7.8	28 41.0		1 50.3	+ 6 14.3	+0.0154	0.5549	0.0107	+16 -44
G. Sagittarii	6.1	+0.01	-7.8	-28 28.3		3 49.3	+ 8 9.0	-0.1885	0.5543	+0.0162	+ 7 -56
Sagittarii	3.5	-0.14	8.0	27 48.0		23 27.8	+ 3 5.8	-0.0981	0.5472	0.0671	+17 -50
B. Sagittarii	6.2	0.14	7.7	28 46.4		23 41.9	+ 3 19.4	+0.0856	0.5471	0.0677	+62 +15
B. Sagittarii	5.9	0.20	7.9	28 2.2	2	7 18.0	+10 39.6	+0.7661	0.5435	0.0867	+62 - 1
B. Sagittarii	5.7	0.22	8.1	27 10.0		9 44.2	-10 59.2	+0.0269	0.5423	0.0923	+25 -43
Sagittarii	4.8	-0.28	-8.1	-26 32.0		21 37.9	+ 0 30.5	+0.5936	0.5358	+0.1194	+59 -11
Sagittarii	4.9	0.29	8.1	26 26.0		23 5.3	+ 1 55.0	+0.6608	0.5349	0.1225	+63 - 8
B. Capricorni	6.3	0.41	8.3	24 5.7	3	18 45.0	- 3 3.4	+0.8896	0.5233	0.1625	+66 + 6
Capricorni	5.8	0.42	8.7	21 50.0		21 43.8	- 0 10.2	-1.1262	0.5214	0.1677	-32 -90
Capricorni	4.8	0.47	8.8	20 12.1	4	6 48.8	+ 8 37.9	-1.3409	0.5159	0.1836	-55 -90
Capricorni	5.3	-0.47	-8.5	-21 32.8		8 53.0	+10 38.3	+0.5349	0.5147	+0.1867	+62 -16

[Eph 13]

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1913.o.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
27 Capricorni	6.1	-0.48	- 8.6	-20 54.5	4 9 23.2	+11 7.5	-0.0790	0.5144	+0.1875	+30	-49
φ Capricorni	5.3	0.49	8.5	21 0.9	12 28.5	- 9 52.8	+0.6268	0.5126	0.1922	+67	-11
128 B. Capricorni	6.5	0.50	8.4	19 31.8	19 52.0	- 2 42.4	+0.4394	0.5084	0.2033	+59	-21
γ Capricorni	3.8	0.54	8.6	17 3.5	5 1 8.8	+ 2 25.0	-1.2165	0.5056	0.2103	-33	-90
δ Capricorni	3.0	0.55	8.6	16 31.5	4 48.1	+ 5 58.0	-1.0311	0.5036	0.2152	-18	-90
152 B. Capricorni	6.5	-0.55	- 8.4	-17 15.2	6 29.2	+ 7 36.2	+0.1443	0.5027	+0.2174	+46	-37
NEW MOON.											
60 Piscium	6.2	-0.69	- 1.9	+ 6 16.0	9 9 53.1	+ 8 18.9	-0.8344	0.4879	+0.2617	+ 1	-84
62 Piscium	6.1	0.70	1.8	6 49.5	10 22.8	+ 8 47.8	-1.3192	0.4881	0.2616	-34	-84
147 B. Piscium	5.9	-0.67	- 2.3	+ 4 50.0	10 24.2	+ 8 49.2	+0.8774	0.4881	+0.2615	+90	0
171 B. Piscium	6.3	0.66	1.4	6 0.8	16 49.5	- 8 55.9	+1.2517	0.4901	0.2592	+90	+27
ε Piscium	4.4	0.67	- 1.0	7 25.3	18 33.1	- 7 15.2	+0.1530	0.4906	0.2586	+53	-36
π Piscium	5.6	0.62	+ 1.3	11 41.8	10 13 7.6	+10 48.6	+0.1786	0.4990	0.2469	+54	-33
20 H ¹ . Arietis	6.4	0.57	3.9	16 49.1	11 5 59.0	+ 3 10.4	-1.3515	0.5090	0.2313	-44	-74
19 Arietis	5.8	-0.53	+ 3.6	+14 52.4	7 53.0	+ 5 1.0	+1.1956	0.5103	+0.2292	+90	+28
27 Arietis	6.4	0.47	5.0	17 19.3	16 51.0	-10 17.3	+0.5508	0.5166	0.2182	+80	-10
μ Arietis	5.7	0.45	6.0	19 38.6	22 28.2	- 4 50.6	-0.7513	0.5210	0.2103	+ 4	-71
47 Arietis	5.8	0.38	6.8	20 19.3	12 6 2.7	+ 2 29.5	+0.0705	0.5269	0.1991	+49	-31
ε Arietis (mean)	4.6	0.38	7.1	20 59.7	6 35.0	+ 3 0.8	-0.5455	0.5274	0.1982	+15	-64
ζ Arietis	5.0	-0.28	+ 7.6	+20 43.5	13 58.6	+10 9.9	+1.1628	0.5336	+0.1853	+90	+33
66 Arietis	6.1	0.23	8.5	22 30.4	20 11.2	- 7 50.0	+0.3710	0.5388	0.1739	+67	-13
7 Tauri	5.9	0.21	9.2	24 10.6	22 53.2	- 5 13.4	-0.9475	0.5412	0.1683	-10	-66
16 Tauri	5.4	0.14	9.4	24 1.1	13 3 32.1	- 0 44.0	-0.0169	0.5451	0.1590	+44	-31
17 Tauri	3.8	0.14	9.4	23 50.6	3 34.2	- 0 42.0	+0.1760	0.5452	0.1588	+55	-22
18 Tauri	5.6	-0.15	+ 9.6	+24 34.2	3 41.2	- 0 35.3	-0.5790	0.5453	+0.1585	+13	-61
q Tauri	4.3	0.14	9.5	24 11.9	3 42.8	- 0 33.7	-0.1789	0.5453	0.1585	+35	-39
20 Tauri	4.1	0.14	9.5	24 6.0	3 59.4	- 0 17.6	-0.0302	0.5455	0.1581	+43	-31
21 Tauri	5.8	0.14	9.5	24 17.2	4 1.4	- 0 15.7	-0.2239	0.5455	0.1581	+32	-42
22 Tauri	6.5	0.14	9.5	24 15.6	4 5.1	- 0 12.2	-0.1857	0.5456	0.1578	+34	-39
23 Tauri	4.3	-0.13	+ 9.3	+23 40.8	4 13.0	- 0 4.6	+0.4518	0.5457	+0.1576	+73	- 7
η Tauri	3.0	0.12	9.4	23 50.4	4 43.8	+ 0 25.2	+0.3630	0.5461	0.1566	+67	-12
104 B. Tauri	5.5	0.11	9.2	23 9.4	5 7.3	+ 0 47.8	+1.1505	0.5465	0.1559	+90	+35
27 Tauri	3.7	0.11	9.5	23 47.4	5 28.4	+ 1 8.2	+0.5308	0.5468	0.1551	+80	- 2
28 Tauri	5.2	0.11	9.5	23 52.5	5 29.0	+ 1 8.8	+0.4436	0.5469	0.1549	+73	- 7
14 H. Tauri	5.3	-0.11	+10.0	+25 19.2	5 57.6	+ 1 36.4	-1.0214	0.5472	+0.1542	-16	-65
p Tauri	5.6	+0.02	10.7	26 15.5	14 53.0	+10 12.8	-0.7249	0.5548	0.1336	+ 4	-64
φ Tauri	5.0	0.07	11.2	27 8.8	18 56.1	- 9 52.9	-1.1403	0.5583	0.1241	-28	-63
χ Tauri	5.3	0.09	10.6	25 25.7	19 54.3	- 8 56.8	+0.7949	0.5591	0.1216	+90	+15
17 B. Aurigæ	6.0	0.31	11.7	27 45.4	14 8 25.2	+ 3 6.0	-0.3347	0.5688	0.0889	+26	-41
38 B. Aurigæ	6.5	+0.40	+11.7	+27 34.7	13 14.2	+ 7 44.0	+0.2479	0.5721	+0.0753	+60	- 9
47 B. Aurigæ	6.0	0.44	11.8	27 55.5	15 17.5	+ 9 42.5	+0.0348	0.5735	0.0695	+47	-19
354 B. Tauri	6.4	0.51	11.8	27 52.4	19 47.4	- 9 58.0	+0.3723	0.5765	0.0564	+68	0
22 Aurigæ	6.4	0.53	12.1	28 51.5	20 43.4	- 9 4.3	-0.6021	0.5770	0.0535	+10	-54
β Tauri	1.8	0.55	12.0	28 32.3	21 53.0	- 7 57.4	-0.2084	0.5777	0.0502	+33	-30
107 B. Aurigæ	6.5	+0.62	+11.6	+27 36.6	15 1 42.2	- 4 17.2	+0.9268	0.5798	+0.0386	+90	+31
116 B. Aurigæ	5.9	0.65	12.1	29 10.2	3 0.2	- 3 2.3	-0.6451	0.5805	0.0345	+ 8	-56
406 B. Tauri	5.6	0.74	11.5	27 56.8	7 35.1	+ 1 21.6	+0.7502	0.5829	0.0206	+90	+22
136 Tauri	4.6	0.75	11.3	27 35.7	8 30.6	+ 2 14.9	+1.1301	0.5832	0.0176	+90	+47
154 B. Aurigæ	6.4	0.79	11.8	28 56.0	9 44.7	+ 3 26.1	-0.2335	0.5837	0.0138	+31	-28
415 B. Tauri	6.1	+0.81	+11.2	+27 34.3	11 29.5	+ 5 6.6	+1.1918	0.5843	+0.0081	+90	+53
183 B. Aurigæ	6.3	0.87	11.8	29 31.4	13 32.1	+ 7 4.3	-0.8126	0.5851	+0.0016	- 3	-61
κ Aurigæ	4.4	0.94	11.5	29 32.1	17 0.7	+10 24.4	-0.8344	0.5863	-0.0094	- 5	-61
211 B. Aurigæ	6.3	0.96	11.5	29 35.1	19 14.7	-11 27.0	-0.9137	0.5871	0.0163	-10	-61
49 Aurigæ	5.1	1.06	10.6	28 5.6	16 0 38.5	- 6 16.4	+0.4823	0.5880	0.0337	+77	+ 6
53 Aurigæ	5.6	+1.09	+10.8	+29 3.8	1 50.6	- 5 7.3	-0.5531	0.5882	-0.0375	+13	-50

**ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
MARCH.**

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i> .	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>°</i>
3 Scorpii	5.9	+1.47	-11.6	-24 59.4	25 21 49.8	+ 6 14.1	+0.3605	0.5627	-0.1534	+48	-25
40 B. Scorpii	5.4	1.45	11.6	24 35.1	23 28.4	+ 7 49.1	-0.3095	0.5630	0.1493	+13	-63
π Scorpii	3.0	1.46	11.3	25 52.1	23 34.1	+ 7 54.6	+1.0090	0.5630	0.1490	+65	+15
48 B. Scorpii	4.9	1.44	11.3	25 37.6	26 1 26.8	+ 9 43.0	+0.4838	0.5634	0.1440	+54	-18
50 B. Scorpii	6.4	1.44	11.6	24 29.4	1 41.9	+ 9 57.6	-0.7342	0.5635	0.1434	- 9	-90
24 G. Scorpii	6.2	+1.42	-11.6	-24 14.0	3 20.9	+11 32.9	-1.2365	0.5638	-0.1390	-47	-90
65 B. Scorpii	5.5	1.43	11.1	26 5.8	3 25.4	+11 37.3	+0.6939	0.5638	0.1390	+64	- 6
85 B. Scorpii	6.0	1.40	11.2	25 15.6	6 15.1	- 9 39.4	-0.5617	0.5645	0.1316	- 1	-84
σ Scorpii	3.1	1.38	11.0	25 23.3	8 51.8	- 7 8.5	-0.7637	0.5648	0.1244	-13	-90
α Scorpii	1.2	1.35	10.6	26 14.6	12 15.2	- 3 52.8	-0.2773	0.5652	0.1152	+11	-62
116 B. Scorpii	6.2	+1.35	-10.6	-26 21.1	13 4.1	- 3 5.8	-0.2562	0.5653	-0.1129	+12	-60
134 B. Scorpii	6.4	1.30	10.0	27 17.8	18 23.2	+ 2 1.4	+0.1727	0.5659	0.0984	+33	-35
135 B. Scorpii	6.0	1.31	9.7	28 21.1	18 39.8	+ 2 17.4	+1.2552	0.5660	0.0978	+62	+45
95 G. Ophiuchi	6.1	1.22	9.4	27 39.5	27 5 59.2	-10 48.7	-0.3984	0.5659	0.0655	0	-70
43 Ophiuchi	5.4	1.18	9.0	28 3.7	10 30.0	- 6 28.1	-0.2371	0.5654	0.0528	+ 8	-59
163 G. Ophiuchi	6.3	+1.09	- 8.6	-27 50.7	18 45.7	+ 1 29.1	-0.8084	0.5642	-0.0290	-25	-90
X Sagittarii (<i>var.</i>)	4.4	1.11	8.5	27 48.1	20 32.2	+ 3 11.6	-0.9036	0.5637	0.0240	-31	-90
10 G. Sagittarii	5.7	1.07	8.2	28 3.2	28 0 20.3	+ 6 51.2	-0.7050	0.5626	0.0131	-20	-90
210 B. Scorpii	5.8	1.07	7.9	28 45.1	1 8.6	+ 7 37.6	+0.0337	0.5624	0.0111	+17	-43
W Sagittarii (<i>var.</i>)	4.3	1.04	7.5	29 35.2	3 47.5	+10 10.6	+0.9110	0.5617	-0.0036	+61	+10
38 B. Sagittarii	4.7	+1.02	- 7.8	-28 28.2	5 5.7	+11 25.9	-0.2911	0.5613	+0.0001	0	-63
C. D. -28° 14268	6.4	1.00	7.5	28 55.4	6 43.2	-11 0.2	+0.2005	0.5608	0.0049	+26	-33
48 G. Sagittarii	6.3	0.97	7.7	28 19.2	9 0.6	- 8 47.8	-0.4311	0.5599	0.0111	- 6	-73
62 B. Sagittarii	6.0	0.98	7.5	28 41.0	9 0.8	- 8 47.6	-0.0383	0.5599	0.0111	+14	-47
δ Sagittarii	2.8	0.97	7.0	29 52.1	10 30.3	- 7 21.4	+1.2578	0.5593	0.0151	+61	+50
58 G. Sagittarii	6.1	+0.95	- 7.5	-28 28.3	10 57.5	- 6 55.2	-0.2392	0.5591	+0.0164	+ 4	-59
τ Sagittarii	3.5	0.76	6.5	27 48.0	29 6 16.9	+11 42.4	-0.1457	0.5501	0.0679	+14	-53
183 B. Sagittarii	6.2	0.77	6.2	28 46.4	6 30.8	+11 55.8	+0.9294	0.5500	0.0686	+62	+11
234 B. Sagittarii	5.9	0.68	6.0	28 2.2	14 1.4	- 4 49.4	+0.7140	0.5455	0.0871	+62	- 4
248 B. Sagittarii	5.7	0.65	6.1	27 9.9	16 26.0	- 2 29.8	-0.0194	0.5440	0.0930	+23	-46
ω Sagittarii	4.8	+0.55	- 5.6	-26 32.0	30 4 13.2	+ 8 53.3	+0.5474	0.5365	+0.1200	+56	-14
A Sagittarii	4.9	0.53	5.6	26 26.0	5 40.0	+10 17.1	+0.6148	0.5356	0.1232	+60	-10
56 B. Capricorni	6.3	0.35	5.1	24 5.6	31 1 13.8	+ 5 12.9	+0.8492	0.5226	0.1622	+66	+ 3
17 Capricorni	5.8	0.29	5.7	21 49.9	4 12.2	+ 8 5.7	-1.1580	0.5206	0.1677	-34	-90
χ Capricorni	5.3	0.19	5.2	21 32.7	15 20.4	- 5 6.8	+0.5005	0.5135	0.1865	+60	-18
27 Capricorni	6.1	+0.18	- 5.4	-20 54.5	15 50.6	- 4 37.5	-0.1114	0.5132	+0.1873	+29	-51
ϕ Capricorni	5.3	+0.18	- 5.1	-21 0.9	18 55.8	- 1 37.9	+0.5935	0.5112	+0.1924	+66	-13

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128 B. Capricorni	6.5	+0.11	- 5.1	-19 31.8	1 2 19.2	+ 5 32.3	+0.4089	0.5070	+0.2028	+58	-23
γ Capricorni	3.8	0.04	5.5	17 3.4	7 36.1	+10 39.8	-1.2419	0.5039	0.2102	-35	-90
δ Capricorni	3.0	+0.01	5.4	16 31.4	11 15.7	- 9 46.8	-1.0561	0.5020	0.2147	-20	-90
152 B. Capricorni	6.5	0.00	5.1	17 15.2	12 56.8	- 8 8.7	+0.1172	0.5011	0.2168	+44	-38
ϵ Aquarii	4.4	-0.07	5.3	14 17.6	21 39.3	+ 0 19.0	-1.2342	0.4969	0.2269	-31	-90
39 Aquarii	6.2	-0.09	- 5.0	-14 37.4	2 0 53.8	+ 3 27.9	-0.1255	0.4955	+0.2302	+33	-52
42 Aquarii	5.5	0.11	5.2	13 16.0	3 17.4	+ 5 47.5	-1.0777	0.4945	0.2327	-18	-90
45 Aquarii	6.1	0.12	5.0	13 44.5	4 29.3	+ 6 57.4	-0.2702	0.4940	0.2339	+27	-60
50 Aquarii	5.9	0.13	4.8	13 58.3	7 28.0	+ 9 51.1	+0.6863	0.4928	0.2369	+77	- 9
182 B. Aquarii	6.2	0.16	4.8	13 21.7	10 32.0	-11 10.0	+0.7405	0.4917	0.2396	+77	- 6
58 Aquarii	6.4	-0.18	- 5.2	-11 21.2	11 28.3	-10 15.2	-1.2650	0.4914	+0.2403	-32	-90
70 Aquarii	6.1	0.22	4.5	11 1.0	20 49.7	- 1 9.1	+0.6479	0.4884	0.2479	+79	-11
81 Aquarii	6.4	0.29	4.8	7 31.8	3 4 5.4	+ 5 54.9	-1.4002	0.4867	0.2528	-47	-90
<i>h</i> Aquarii	5.4	0.30	4.5	8 9.9	6 12.3	+ 7 58.4	-0.1595	0.4861	0.2542	+36	-53
ϕ Aquarii	4.4	0.34	4.5	6 31.2	11 24.0	-10 58.2	-0.6548	0.4854	0.2568	+11	-87
96 Aquarii	5.7	-0.36	- 4.4	- 5 36.1	14 16.6	- 8 10.3	-0.9307	0.4850	+0.2583	- 4	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i> .	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
317 B. Aquarii	6.3	-0.36	-4.3	6 23.1	8 15 1.1	-7 26.9	+0.1292	0.4849	+0.2586	+51	-38
337 B. Aquarii	6.4	0.38	4.0	5 0.5	20 2.6	-2 33.4	-0.0892	0.4844	0.2609	+40	-49
342 B. Aquarii	6.5	-0.39	-4.0	4 33.8	21 10.8	-1 27.0	-0.2837	0.4843	+0.2612	+30	-60
NEW MOON.											
μ Arietis	5.7	-0.63	+4.6	+19 38.6	8 4 10.3	+2 39.0	-0.7659	0.5245	+0.2115	+3	-71
47 Arietis	5.8	0.58	5.4	20 19.3	11 41.0	+9 55.2	+0.0528	0.5303	0.1998	+48	-32
<i>e</i> Arietis (<i>mean</i>)	4.6	0.59	5.6	20 59.7	12 13.1	+10 26.3	-0.5621	0.5308	0.1988	+15	-65
ζ Arietis	5.0	0.54	6.1	20 43.5	19 33.4	-6 27.9	+1.1431	0.5367	0.1864	+90	+31
66 Arietis	6.1	0.50	7.0	22 30.4	9 1 43.9	-0 29.8	+0.3511	0.5416	0.1745	+66	-14
7 Tauri	5.9	-0.50	+7.5	+24 10.5	4 25.1	+2 5.8	-0.9683	0.5439	+0.1691	-11	-66
16 Tauri	5.4	0.45	7.9	24 1.1	9 2.8	+6 34.0	-0.0382	0.5475	0.1596	+43	-32
17 Tauri	3.8	0.44	7.9	23 50.6	9 4.9	+6 36.0	+0.1548	0.5475	0.1596	+54	-22
18 Tauri	5.6	0.45	8.0	24 34.2	9 11.8	+6 42.6	-0.6008	0.5476	0.1593	+12	-62
<i>q</i> Tauri	4.3	0.45	7.9	24 11.8	9 13.4	+6 44.2	-0.2004	0.5477	0.1591	+34	-40
20 Tauri	4.1	-0.44	+7.9	+24 5.9	9 30.0	+7 0.3	-0.0515	0.5479	+0.1585	+42	-32
21 Tauri	5.8	0.45	8.0	24 17.2	9 31.9	+7 2.1	-0.2456	0.5479	0.1585	+31	-42
22 Tauri	6.5	0.45	8.0	24 15.6	9 35.7	+7 5.7	-0.2074	0.5480	0.1583	+33	-41
23 Tauri	4.3	0.44	7.9	23 40.8	9 43.6	+7 13.3	+0.4305	0.5481	0.1580	+72	-8
η Tauri	3.0	0.43	8.0	23 50.3	10 14.2	+7 42.9	+0.3417	0.5484	0.1569	+66	-12
104 B. Tauri	5.5	-0.42	+7.8	+23 9.4	10 37.7	+8 5.5	+1.1293	0.5487	+0.1561	+90	+34
27 Tauri	3.7	0.42	8.0	23 47.4	10 58.7	+8 25.8	+0.5096	0.5490	0.1553	+78	-4
28 Tauri	5.2	0.43	8.0	23 52.4	10 59.3	+8 26.4	+0.4220	0.5490	0.1553	+71	-9
14 H. Tauri	5.3	0.43	8.4	25 19.2	11 27.7	+8 53.8	-1.0440	0.5494	0.1543	-17	-65
ρ Tauri	5.6	0.35	9.2	26 15.4	20 22.2	-6 30.7	-0.7499	0.5563	0.1338	+2	-64
ϕ Tauri	5.0	-0.30	+9.7	+27 8.7	10 0 25.2	-2 36.4	-1.1673	0.5592	+0.1239	-30	-63
χ Tauri	5.3	0.27	9.3	25 25.6	1 23.4	-1 40.4	+0.7723	0.5600	0.1216	+90	+14
17 B. Aurigæ	6.0	0.11	10.6	27 45.3	13 56.4	+10 24.7	-0.3632	0.5685	0.0885	+24	-43
38 B. Aurigæ	6.5	0.03	10.7	27 34.7	18 47.0	-8 55.8	+0.2211	0.5715	0.0754	+58	-10
47 B. Aurigæ	6.0	-0.01	10.8	27 55.5	20 51.1	-6 56.5	+0.0067	0.5726	0.0691	+45	-21
354 B. Tauri	6.4	+0.06	+10.9	+27 52.4	11 1 23.2	-2 34.9	+0.3455	0.5748	+0.0561	+66	-2
22 Aurigæ	6.4	0.07	11.3	28 51.5	2 19.7	-1 40.6	-0.6353	0.5753	0.0533	+8	-57
β Tauri	1.8	0.10	11.1	28 32.3	3 29.9	-0 33.1	-0.2395	0.5758	0.0498	+31	-32
107 B. Aurigæ	6.5	0.16	10.9	27 36.6	7 21.6	+3 9.5	+0.9030	0.5777	0.0385	+90	+29
116 B. Aurigæ	5.9	0.18	11.4	29 10.1	8 40.5	+4 25.3	-0.6801	0.5781	0.0345	+5	-59
406 B. Tauri	5.5	+0.27	+11.1	+27 56.8	13 18.7	+8 52.6	+0.7248	0.5796	+0.0202	+90	+21
136 Tauri	4.6	0.29	10.9	27 35.7	14 14.9	+9 46.5	+1.1074	0.5799	0.0172	+90	+45
154 B. Aurigæ	6.4	0.31	11.4	28 56.0	15 30.0	+10 58.7	-0.2672	0.5803	0.0136	+29	-30
415 B. Tauri	6.1	0.34	10.9	27 34.3	17 16.4	-11 19.1	+1.1698	0.5809	0.0081	+90	+51
183 B. Aurigæ	6.3	0.37	11.5	29 31.4	19 20.8	-9 19.6	-0.8519	0.5815	+0.0018	-6	-61
κ Aurigæ	4.4	+0.43	+11.4	+29 32.1	22 52.8	-5 56.0	-0.8750	0.5820	-0.0091	-7	-61
211 B. Aurigæ	6.3	0.48	11.4	29 35.1	12 1 9.2	-3 45.1	-0.9557	0.5823	0.0162	-13	-61
49 Aurigæ	5.1	0.57	10.7	28 5.6	6 39.0	+1 31.6	+0.4533	0.5831	0.0335	+75	+5
53 Aurigæ	5.6	0.60	11.0	29 3.8	7 52.6	+2 42.2	-0.5933	0.5831	0.0372	+11	-52
54 Aurigæ	5.8	0.61	10.7	28 20.6	8 20.6	+3 9.1	+0.1331	0.5830	0.0387	+53	-11
28 Geminorum	5.5	+0.65	+10.9	+29 3.8	10 21.8	+5 5.4	-0.6953	0.5829	-0.0450	+5	-60
47 Geminorum	5.6	0.82	9.6	27 0.2	20 48.2	-8 53.2	+0.7885	0.5821	0.0773	+90	+19
53 Geminorum	5.9	0.86	9.8	28 3.1	22 34.6	-7 11.0	-0.4334	0.5817	0.0827	+20	-45
134 B. Geminorum	6.5	0.86	9.3	26 51.0	23 1.6	-6 45.1	+0.7661	0.5816	0.0842	+90	+17
59 Geminorum	5.7	0.92	9.5	27 48.6	13 1 57.4	-3 56.4	-0.4806	0.5810	0.0929	+18	-50
ι Geminorum	3.9	+0.93	+9.5	+27 58.5	2 25.2	-3 29.6	-0.6934	0.5809	-0.0943	+5	-63
δ^1 Geminorum	5.0	0.96	9.5	28 18.1	3 50.0	-2 8.2	-1.1644	0.5805	0.0987	-31	-62
δ^2 Geminorum	5.0	0.96	9.4	28 5.9	4 1.3	-1 57.3	-0.9759	0.5805	0.0990	-14	-62
υ Geminorum	4.3	1.00	8.8	27 5.5	6 26.8	+0 22.4	-0.1924	0.5800	0.1066	+34	-34
ϵ Geminorum	5.5	1.04	8.1	25 59.6	9 42.0	+3 29.9	+0.5703	0.5788	0.1159	+85	+4
ϕ Geminorum	5.0	+1.12	+8.1	+26 59.6	13 24.7	+7 3.8	-0.9026	0.5775	-0.1266	-8	-64

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Par- allels.		
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x	y	N.	S.	
		Δα	Δδ									
		s	"	°	d	h	m	h	m		°	°
α Cancrī	5.9	+1.16	+ 7.4	+25 38.0	18	16	23.6	+ 9 55.7	+0.0967	0.5764	-0.1348	+50 -22
4 Cancrī	6.2	1.16	7.2	25 19.9		16	43.2	+10 14.5	+0.3608	0.5763	0.1358	+67 - 9
ψ Cancrī	5.9	1.21	6.9	25 46.4		20	12.7	-10 24.1	-0.5820	0.5749	0.1455	+12 -59
λ Cancrī	5.9	1.25	6.1	24 17.9	14	0	17.6	- 6 28.8	+0.3035	0.5730	0.1562	+63 -13
28 Cancrī	6.1	1.31	5.7	24 26.1		3	34.0	- 3 19.9	-0.3629	0.5715	0.1651	+25 -49
ν ¹ Cancrī	5.7	+1.33	+ 5.6	+24 22.6		4	45.0	- 2 11.6	-0.4996	0.5710	-0.1679	+17 -57
ν ² Cancrī	6.4	1.34	5.5	24 23.0		5	21.4	- 1 36.6	-0.6084	0.5707	0.1695	+11 -63
γ Cancrī	4.7	1.37	4.0	21 47.0		9	36.2	+ 2 28.5	+1.2847	0.5686	0.1801	+90 +48
90 H ¹ . Cancrī	6.1	1.53	+ 2.4	21 38.6		22	13.1	- 9 23.0	-1.0356	0.5619	0.2089	-15 -69
107 B. Leonis	6.3	1.71	- 2.3	16 10.8	15	20	40.3	-11 44.3	-0.7308	0.5505	0.2505	+ 6 -74
34 Leonis	6.4	+1.70	- 3.4	+13 47.0		23	18.4	- 9 11.8	+1.0025	0.5493	-0.2543	+90 +13
37 Leonis	5.5	1.73	3.6	14 9.7	16	1	32.1	- 7 2.7	+0.0531	0.5483	0.2575	+47 -38
l Leonis	5.3	1.82	6.4	11 0.2		16	8.8	+ 7 3.7	-0.6994	0.5426	0.2753	+ 8 -79
χ Leonis	4.7	1.82	8.0	7 48.3		23	20.3	- 9 59.6	+0.4811	0.5405	0.2817	+73 -19
308 B. Leonis	5.8	1.87	8.3	8 32.1	17	3	26.4	- 6 1.6	-1.4090	0.5394	0.2848	-48 -82
δ Leonis	4.1	+1.87	- 9.2	+ 6 30.2		6	42.8	- 2 51.9	-0.3254	0.5385	-0.2873	+28 -63
80 Leonis	6.4	1.85	9.9	4 20.2		8	52.7	- 0 46.3	+1.2064	0.5382	0.2883	+90 +22
89 Leonis	5.7	1.87	10.5	3 32.4		12	48.8	+ 3 1.9	+0.8576	0.5377	0.2900	+90 0
β Virginis	3.8	1.92	11.6	2 15.1		20	19.0	+10 17.0	-0.0513	0.5369	0.2926	+42 -48
27 B. Virginis	6.5	1.91	12.1	+ 1 0.7	18	0	13.4	- 9 56.4	+0.0362	0.5368	0.2930	+46 -43
13 Virginis	5.9	+1.95	-13.1	- 0 18.4		9	17.8	- 1 10.1	-1.3183	0.5370	-0.2929	-32 -90
162 B. Virginis	6.2	1.94	14.0	4 8.3		13	32.6	+ 2 56.2	+1.2465	0.5374	0.2918	+86 +27
200 B. Virginis	6.3	1.94	14.2	4 34.6		15	17.3	+ 4 37.4	+1.1735	0.5376	0.2914	+86 +21
f Virginis	6.0	1.95	14.4	5 21.4		17	39.5	+ 6 54.9	+1.2586	0.5379	0.2908	+85 +28
319 B. Virginis	6.3	1.97	14.8	5 49.8		22	36.6	+11 42.0	+0.2942	0.5388	0.2883	+61 -30
g Virginis	5.6	+2.00	-15.6	- 8 31.4	19	8	12.3	- 3 1.6	+0.2363	0.5410	-0.2822	+57 -32
50 Virginis	6.2	1.99	15.7	9 52.2		8	45.1	- 2 29.9	+1.4263	0.5412	0.2816	+81 +54
α Virginis	1.2	2.01	16.0	10 42.7		15	44.9	+ 4 15.7	+0.3178	0.5434	0.2750	+60 -28
550 B. Virginis	6.0	2.03	16.2	12 46.4		20	0.4	+ 8 22.4	+1.2170	0.5449	0.2706	+78 +26
86 Virginis	5.6	2.05	16.3	11 59.7	20	1	3.0	-10 45.4	-0.9129	0.5468	0.2641	- 6 -90
621 B. Virginis	6.4	+2.06	-16.4	-14 33.5		9	14.2	- 2 51.4	-0.4632	0.5502	-0.2528	+17 -72
214 G. Virginis	6.5	2.06	16.4	15 55.5		9	34.1	- 2 32.1	+0.8262	0.5503	0.2523	+75 - 1
40 H. Virginis	5.1	2.07	16.4	15 53.8		12	2.0	- 0 9.4	+0.1801	0.5514	0.2484	+49 -35
43 B. Libræ	5.7	2.14	16.3	21 1.7	21	8	2.3	- 4 52.2	+0.7477	0.5603	0.2115	+68 - 4
47 G. Libræ	6.1	2.12	15.5	21 41.9		11	52.3	- 1 10.6	+0.6342	0.5620	0.2029	+68 -10
64 G. Libræ	5.8	+2.12	-15.3	-22 4.9		16	2.6	+ 2 50.4	+0.1972	0.5638	-0.1936	+43 -34
153 B. Libræ	6.3	2.15	14.7	24 11.9		22	59.9	+ 9 32.3	+1.0700	0.5665	0.1772	+66 +19
169 B. Libræ	6.0	2.14	14.8	22 51.5	22	0	56.5	+11 24.6	-0.6439	0.5672	0.1722	- 2 -90
177 B. Libræ	6.2	2.14	14.7	22 52.2		1	35.1	-11 58.3	-0.7417	0.5675	0.1707	- 8 -90
42 Libræ	5.0	2.14	14.6	23 32.4		1	57.4	-11 36.9	-0.1182	0.5676	0.1698	+24 -51
b Scorpii	4.7	+2.15	-14.0	-25 29.5		6	20.0	- 7 24.2	+1.1673	0.5692	-0.1587	+65 +29
A Scorpii	4.6	2.15	14.0	25 4.3		7	25.2	- 6 21.4	+0.5649	0.5696	0.1559	+59 -13
31 B. Scorpii	5.4	2.14	14.1	24 16.7		7	32.9	- 6 14.0	-0.2713	0.5696	0.1556	+15 -61
32 B. Scorpii	5.3	2.13	14.2	23 43.4		7	34.1	- 6 12.9	-0.8463	0.5696	0.1556	-15 -90
3 Scorpii	5.9	2.14	14.0	24 59.4		7	51.0	- 5 56.6	+0.4143	0.5697	0.1549	+51 -22
40 B. Scorpii	5.4	+2.14	-13.9	-24 35.1		9	27.7	- 4 23.5	-0.2496	0.5701	-0.1504	+16 -60
π Scorpii	3.0	2.15	13.7	25 52.1		9	33.2	- 4 18.2	+1.0588	0.5701	0.1504	+65 +19
48 B. Scorpii	4.9	2.14	13.6	25 37.6		11	23.7	- 2 31.9	+0.5388	0.5706	0.1452	+57 -15
50 B. Scorpii	6.4	2.13	13.8	24 29.5		11	38.5	- 2 17.7	-0.6694	0.5707	0.1445	- 6 -90
24 G. Scorpii	6.2	2.12	13.7	24 14.0		13	15.5	- 0 44.4	-1.1663	0.5711	0.1403	-39 -90
65 B. Scorpii	5.5	+2.14	-13.3	-26 5.9		13	19.9	- 0 40.2	+0.7482	0.5711	-0.1400	+62 - 2
85 B. Scorpii	6.0	2.12	13.3	25 15.6		16	6.1	+ 1 59.6	-0.4953	0.5719	0.1326	+ 1 -77
σ Scorpii	3.1	2.11	13.0	25 23.3		18	39.4	+ 4 27.2	-0.6937	0.5725	0.1257	- 9 -90
α Scorpii	1.2	2.14	12.6	26 14.6		21	58.4	+ 7 38.5	-0.2099	0.5730	0.1162	+15 -57
116 B. Scorpii	6.2	2.14	12.5	26 21.1		22	46.3	+ 8 24.5	-0.1887	0.5731	0.1138	+16 -56
134 B. Scorpii	6.4	+2.12	-11.8	-27 17.8	23	3	58.3	-10 35.4	+0.2393	0.5738	-0.0990	+36 -31

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

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MAY.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ		d h m	h m					
ε Piscium	4.4	-0.25	+ 1.1	+ 7 25.3	3 7 59.2	+ 9 46.1	+0.1685	0.4942	+0.2592	+54	-35
NEW MOON.											
17 B. Aurigæ	6.0	-0.27	+ 9.2	+27 45.3	7 19 50.3	- 5 54.0	-0.4613	0.5741	+0.0885	+19	-48
38 B. Aurigæ	6.5	0.23	9.4	27 34.7	8 0 36.8	- 1 18.6	+0.1153	0.5767	0.0746	+51	-16
47 B. Aurigæ	6.0	-0.20	+ 9.6	+27 55.5	2 39.3	+ 0 39.1	-0.0999	0.5778	+0.0687	+39	-26
354 B. Tauri	6.4	0.15	9.7	27 52.4	7 7.8	+ 4 57.2	+0.2331	0.5802	0.0558	+59	- 8
22 Aurigæ	6.4	0.15	10.0	28 51.4	8 3.6	+ 5 50.7	-0.7442	0.5805	0.0528	+ 2	-62
β Tauri	1.8	0.13	9.9	28 32.3	9 13.0	+ 6 57.4	-0.3511	0.5810	0.0492	+25	-38
107 B. Aurigæ	6.5	0.08	9.9	27 36.5	13 1.9	+10 37.2	+0.7829	0.5823	0.0378	+90	+22
116 B. Aurigæ	5.9	-0.07	+10.2	+29 10.1	14 19.9	+11 52.2	-0.7947	0.5828	+0.0337	- 2	-61
406 B. Tauri	5.6	-0.01	10.0	27 56.7	18 55.2	- 7 43.5	+0.6009	0.5844	0.0198	+89	+14
136 Tauri	4.6	+0.01	10.0	27 35.7	19 50.8	- 6 50.1	+0.9816	0.5845	0.0168	+90	+36
154 B. Aurigæ	6.4	0.02	10.3	28 55.9	21 5.2	- 5 38.6	-0.3892	0.5847	0.0126	+22	-37
415 B. Tauri	6.1	0.05	10.0	27 34.3	22 50.6	- 3 57.4	+1.0411	0.5850	0.0074	+90	+41
183 B. Aurigæ	6.3	+0.07	+10.5	+29 31.4	9 0 53.8	- 1 59.3	-0.9757	0.5853	+0.0009	-15	-61
κ Aurigæ	4.4	0.12	10.4	29 32.0	4 24.0	+ 1 22.5	-1.0021	0.5858	-0.0100	-17	-61
211 B. Aurigæ	6.3	0.16	10.5	29 35.0	6 39.3	+ 3 32.4	-1.0839	0.5862	0.0171	-25	-61
49 Aurigæ	5.1	0.24	10.1	28 5.6	12 7.0	+ 8 46.9	+0.3173	0.5859	0.0345	+65	- 1
53 Aurigæ	5.6	0.26	10.4	29 3.8	13 20.2	+ 9 57.1	-0.7285	0.5858	0.0383	+ 2	-61
54 Aurigæ	5.8	+0.27	+10.2	+28 20.6	13 48.1	+10 23.9	-0.0037	0.5858	-0.0398	+44	-18
28 Geminorum	5.5	0.30	10.3	29 3.8	15 48.7	-11 40.4	-0.8323	0.5857	0.0462	- 4	-61
47 Geminorum	5.6	0.45	9.4	27 0.2	10 2 13.2	- 1 40.8	+0.6431	0.5836	0.0780	+90	+11
53 Geminorum	5.9	0.48	9.6	28 3.1	3 59.5	+ 0 1.3	-0.5802	0.5831	0.0835	+12	-54
134 B. Geminorum	6.5	0.49	9.3	26 51.0	4 26.4	+ 0 27.0	+0.6193	0.5830	0.0850	+90	+ 9
59 Geminorum	5.7	+0.54	+ 9.4	+27 48.6	7 22.3	+ 3 15.9	-0.6301	0.5822	-0.0937	+ 9	-59
i Geminorum	3.9	0.55	9.4	27 58.5	7 50.0	+ 3 42.6	-0.8433	0.5820	0.0951	- 5	-63
b² Geminorum	5.0	0.57	9.4	28 5.9	9 26.3	+ 5 15.1	-1.1272	0.5813	0.0996	-27	-62
v Geminorum	4.3	0.61	9.0	27 5.5	11 52.0	+ 7 34.9	-0.3445	0.5803	0.1069	+25	-43
c Geminorum	5.5	0.65	8.4	25 59.6	15 7.8	+10 43.1	+0.4176	0.5789	0.1162	+71	- 4
φ Geminorum	5.0	+0.72	+ 8.5	+26 59.7	18 51.3	- 9 42.2	-1.0612	0.5773	-0.1270	-20	-64
ω Cancrī	5.9	0.75	7.9	25 38.0	21 51.2	- 6 49.3	-0.0603	0.5757	0.1350	+41	-30
4 Cancrī	6.2	0.75	7.7	25 19.9	22 10.8	- 6 30.5	+0.2045	0.5755	0.1360	+57	-17
ψ Cancrī	5.9	0.81	7.5	25 46.5	11 1 41.7	- 3 7.7	-0.7434	0.5736	0.1453	+ 3	-65
λ Cancrī	5.9	0.86	6.8	24 17.9	5 48.5	+ 0 49.6	+0.1436	0.5714	0.1562	+53	-21
28 Cancrī	6.1	+0.91	+ 6.5	+24 26.2	9 6.8	+ 4 0.3	-0.5274	0.5694	-0.1646	+16	-58
v¹ Cancrī	5.7	0.93	6.4	24 22.6	10 18.5	+ 5 9.3	-0.6651	0.5687	0.1675	+ 8	-66
v² Cancrī	6.4	0.94	6.4	24 23.0	10 55.3	+ 5 44.7	-0.7748	0.5683	0.1689	+ 1	-66
γ Cancrī	4.7	0.98	5.1	21 47.0	15 12.9	+ 9 52.6	+1.1277	0.5656	0.1793	+90	+32
90 H¹. Cancrī	6.1	1.16	+ 3.8	21 38.6	12 4 0.8	- 1 47.8	-1.2117	0.5576	0.2072	-30	-69
107 B. Leonis	6.3	+1.38	- 0.7	+16 10.9	13 2 55.4	- 3 41.7	-0.9051	0.5441	-0.2469	- 4	-74
34 Leonis	6.4	1.38	1.8	13 47.1	5 37.3	- 1 5.4	+0.8476	0.5426	0.2510	+90	+ 3
37 Leonis	5.5	1.42	1.9	14 9.7	7 54.3	+ 1 7.0	-0.1112	0.5414	0.2541	+39	-47
l Leonis	5.3	1.54	4.7	11 0.3	22 54.2	- 8 23.3	-0.8660	0.5350	0.2706	- 1	-79
χ Leonis	4.7	1.58	6.6	7 48.3	14 6 18.0	- 1 14.3	+0.3354	0.5324	0.2770	+63	-26
δ Leonis	4.1	+1.65	- 7.8	+ 6 30.3	13 53.4	+ 6 6.3	-0.4754	0.5306	-0.2816	+20	-72
80 Leonis	6.4	1.65	8.7	4 20.2	16 7.1	+ 8 15.6	+1.0797	0.5301	0.2828	+90	+13
89 Leonis	5.7	1.68	9.3	3 32.5	20 10.3	-11 49.0	+0.7305	0.5294	0.2848	+90	- 7
β Virginis	3.8	1.76	10.5	2 15.1	15 3 53.9	- 4 20.4	-0.1824	0.5287	0.2868	+35	-55
27 B. Virginis	6.5	1.77	11.1	+ 1 0.7	7 55.2	- 0 26.8	-0.0887	0.5286	0.2876	+40	-49
162 B. Virginis	6.2	+1.85	-13.6	- 4 8.3	21 37.7	-11 10.8	+1.1577	0.5296	-0.2863	+86	+20
200 B. Virginis	6.3	1.87	13.8	4 34.6	23 25.3	- 9 26.8	+1.0862	0.5299	0.2857	+86	+15
f Virginis	6.0	1.89	14.2	5 21.4	16 1 51.5	- 7 5.3	+1.1760	0.5304	0.2849	+85	+21
319 B. Virginis	6.3	1.93	14.6	5 49.8	6 56.8	- 2 10.0	+0.2068	0.5313	0.2832	+56	-34
g Virginis	5.6	2.01	15.7	8 31.4	16 47.4	+ 7 21.4	+0.1646	0.5344	0.2768	+53	-36
50 Virginis	6.2	+2.00	-16.0	- 9 52.2	17 20.9	+ 7 53.8	+1.3703	0.5345	-0.2765	+81	+42

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m				°	°
α Virginis	1.2	+2.07	-16.4	-10 42.7	17 0 30.8	- 9 10.5	+0.2606	0.5373	-0.2700	+56	-31
550 B. Virginis	6.0	2.10	16.9	12 46.4	4 52.0	- 4 58.1	+1.1771	0.5391	0.2659	+78	+23
86 Virginis	5.6	2.15	16.9	11 59.7	10 1.0	+ 0 0.5	-0.9661	0.5414	0.2599	- 9	-90
621 B. Virginis	6.4	2.21	17.3	14 33.5	18 21.6	+ 8 4.0	-0.4959	0.5456	0.2491	+15	-75
214 G. Virginis	6.5	2.22	17.5	15 55.5	18 41.8	+ 8 23.6	+0.8063	0.5457	0.2487	+75	- 2
40 H. Virginis	5.1	+2.24	-17.5	-15 53.8	21 12.2	+10 48.8	+0.1588	0.5471	-0.2447	+47	-36
43 B. Libræ	5.7	2.44	18.1	21 1.7	18 17 28.6	+ 6 22.2	+0.7672	0.5582	0.2090	+69	- 3
47 G. Libræ	6.1	2.46	17.3	21 41.9	21 20.8	+10 5.9	+0.6595	0.5603	0.2006	+68	- 9
64 G. Libræ	5.8	2.49	17.0	22 5.0	19 1 33.0	- 9 51.1	+0.2280	0.5626	0.1912	+44	-32
153 B. Libræ	6.3	2.55	16.6	24 11.9	8 32.8	- 3 6.8	+1.1163	0.5662	0.1753	+66	+23
169 B. Libræ	6.0	+2.55	-16.4	-22 51.5	10 29.9	- 1 14.1	-0.6006	0.5671	-0.1705	- 1	-86
177 B. Libræ	6.2	2.55	16.3	22 52.2	11 8.6	- 0 36.9	-0.6974	0.5674	0.1687	- 5	-90
42 Libræ	5.0	2.56	16.3	23 32.4	11 31.0	- 0 15.3	-0.0712	0.5676	0.1678	+27	-49
<i>b</i> Scorpii	4.7	2.61	15.9	25 29.5	15 54.4	+ 3 58.2	+1.2252	0.5696	0.1571	+65	+36
<i>A</i> Scorpii	4.6	2.61	15.8	25 4.3	16 59.7	+ 5 1.1	+0.6232	0.5701	0.1544	+63	-10
31 B. Scorpii	5.4	+2.60	-15.8	-24 16.7	17 7.4	+ 5 8.5	-0.2149	0.5702	-0.1538	+18	-57
32 B. Scorpii	5.3	2.59	15.7	23 43.4	17 8.7	+ 5 9.7	-0.7912	0.5702	0.1538	-12	-90
3 Scorpii	5.9	2.61	15.7	24 59.4	17 25.6	+ 5 26.0	+0.4728	0.5703	0.1532	+54	-18
40 B. Scorpii	5.4	2.62	15.6	24 35.1	19 2.4	+ 6 59.1	-0.1898	0.5710	0.1493	+19	-56
π Scorpii	3.0	2.64	15.6	25 52.1	19 8.0	+ 7 4.5	+1.1215	0.5710	0.1489	+65	+25
48 B. Scorpii	4.9	+2.65	-15.4	-25 37.7	20 58.6	+ 8 50.9	+0.6033	0.5717	-0.1437	+61	-11
50 B. Scorpii	6.4	2.63	15.4	24 29.5	21 13.3	+ 9 5.1	-0.6066	0.5718	0.1431	- 3	-88
24 G. Scorpii	6.2	2.64	15.2	24 14.0	22 50.4	+10 38.5	-1.1015	0.5724	0.1388	-34	-90
65 B. Scorpii	5.5	2.66	15.1	26 5.9	22 54.8	+10 42.7	+0.8162	0.5724	0.1385	+64	+ 2
85 B. Scorpii	6.0	2.66	14.8	25 15.7	20 1 40.9	-10 37.5	-0.4243	0.5733	0.1310	+ 5	-72
σ Scorpii	3.1	+2.67	-14.5	-25 23.3	4 14.0	- 8 10.2	-0.6186	0.5742	-0.1242	- 6	-89
α Scorpii	1.2	2.70	14.1	26 14.6	7 32.6	- 4 59.3	-0.1286	0.5752	0.1149	+18	-52
116 B. Scorpii	6.2	2.70	14.0	26 21.2	8 20.3	- 4 13.4	-0.1059	0.5754	0.1128	+19	-51
134 B. Scorpii	6.4	2.73	13.2	27 17.8	13 31.2	+ 0 45.5	+0.3301	0.5764	0.0980	+41	-26
95 G. Ophiuchi	6.1	2.76	11.6	27 39.5	21 0 47.2	+11 35.2	-0.2109	0.5775	0.0649	+ 9	-57
43 Ophiuchi	5.4	+2.77	-10.8	-28 3.7	5 9.5	- 8 12.7	-0.0426	0.5776	-0.0517	+17	-47
163 G. Ophiuchi	6.3	2.75	9.6	27 50.7	13 9.3	- 0 31.3	-0.5899	0.5765	0.0280	-13	-88
<i>X</i> Sagittarii (<i>var.</i>)	4.4	2.74	9.3	27 48.1	14 52.2	+ 1 7.4	-0.6806	0.5761	0.0226	-18	-90
10 G. Sagittarii	5.7	2.74	8.7	28 3.2	18 32.7	+ 4 39.4	-0.4776	0.5755	0.0119	- 8	-77
210 B. Scorpii	5.8	2.78	8.4	28 45.1	19 19.4	+ 5 24.3	+0.2523	0.5753	0.0094	+29	-30
<i>W</i> Sagittarii (<i>var.</i>)	4.3	+2.79	- 7.8	-29 35.2	21 52.9	+ 7 51.9	+1.1223	0.5743	-0.0019	+61	+29
38 B. Sagittarii	4.7	2.76	7.8	28 28.2	23 8.5	+ 9 4.6	-0.0606	0.5738	+0.0019	+12	-48
C. D. -28° 14268	6.4	2.76	7.5	28 55.4	22 0 42.6	+10 35.1	+0.4271	0.5732	0.0065	+40	-20
48 G. Sagittarii	6.3	2.74	7.3	28 19.1	2 55.4	-11 17.1	-0.1916	0.5724	0.0129	+ 6	-56
62 B. Sagittarii	6.0	2.75	7.1	28 41.0	2 55.6	-11 16.9	+0.1957	0.5724	0.0129	+27	-33
58 G. Sagittarii	6.1	+2.73	- 6.8	-28 28.3	4 48.3	- 9 28.5	+0.0009	0.5717	+0.0186	+16	-44
ϕ Sagittarii	3.3	2.64	5.4	27 5.0	14 33.9	- 0 5.1	-1.1633	0.5668	0.0462	-47	-90
τ Sagittarii	3.5	2.62	3.7	27 48.0	23 28.8	+ 8 30.0	+0.1251	0.5615	0.0704	+28	-37
183 B. Sagittarii	6.2	2.64	3.5	28 46.4	23 42.2	+ 8 42.9	+1.1847	0.5613	0.0710	+62	+35
234 B. Sagittarii	5.9	2.56	2.4	28 2.1	23 6 58.3	- 8 16.9	+0.9842	0.5565	0.0902	+62	+15
248 B. Sagittarii	5.7	+2.52	- 2.2	-27 9.9	9 18.4	- 6 1.8	+0.2654	0.5547	+0.0958	+38	-29
ω Sagittarii	4.8	2.43	0.5	26 31.9	20 44.8	+ 5 0.4	+0.8408	0.5457	0.1231	+64	+ 4
<i>A</i> Sagittarii	4.9	2.41	- 0.3	26 25.9	22 9.2	+ 6 21.9	+0.9093	0.5447	0.1259	+64	+ 9
36 B. Capricorni	6.2	2.18	+ 0.7	22 40.8	24 12 14.4	- 4 1.3	-1.1763	0.5331	0.1554	-38	-90
56 B. Capricorni	6.3	2.16	2.0	24 5.5	17 14.1	+ 0 48.6	+1.1649	0.5291	0.1649	+66	+28
17 Capricorni	5.8	+2.10	+ 1.7	-21 49.8	20 8.8	+ 3 37.7	-0.8166	0.5266	+0.1703	-11	-90
η Capricorni	4.8	1.97	2.3	20 11.9	25 5 2.6	-11 45.4	-1.0202	0.5195	0.1853	-21	-90
χ Capricorni	5.3	1.97	3.0	21 32.6	7 4.7	- 9 47.0	+0.8331	0.5180	0.1886	+69	+ 2
27 Capricorni	6.1	1.95	2.8	20 54.3	7 34.3	- 9 18.4	+0.2275	0.5176	0.1893	+47	-32
ϕ Capricorni	5.3	1.92	3.2	21 0.9	10 36.6	- 6 21.7	+0.9277	0.5153	0.1937	+69	+ 7
128 B. Capricorni	6.5	+1.80	+ 3.6	-19 31.6	17 53.9	+ 0 42.4	+0.7494	0.5099	+0.2043	+70	- 4

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle. H	Y	x'	y'	N.	S.
		Δα	Δδ		d h m	h m				°	°
γ Capricorni	3.8	+1.74	+3.5	-17 3.3	25 23 7.2	+ 5 46.4	-0.8859	0.5064	+0.2108	- 9	-90
δ Capricorni	3.0	1.69	3.6	16 31.3	26 2 44 6	+ 9 17.5	-0.7008	0.5039	0.2154	+ 2	-90
152 B. Capricorni	6.5	1.68	4.1	17 15.0	4 24.8	+10 54.6	+0.4639	0.5028	0.2175	+63	-20
ι Aquarii	4.4	1.53	4.0	14 17.5	13 3.4	- 4 41.7	-0.8784	0.4977	0.2267	- 6	-90
39 Aquarii	6.2	1.50	4.4	14 37.3	16 16.8	- 1 33.7	+0.2229	0.4959	0.2299	+52	-33
42 Aquarii	5.5	+1.45	+4.1	-13 15.9	18 39.7	+ 0 45.2	-0.7251	0.4945	+0.2324	+ 3	-90
45 Aquarii	6.1	1.48	4.6	13 44.4	19 51.4	+ 1 54.9	+0.0779	0.4940	0.2334	+45	-40
50 Aquarii	5.9	1.44	5.0	13 58.2	22 49.5	+ 4 48.0	+1.0289	0.4926	0.2359	+77	+12
182 B. Aquarii	6.2	1.41	5.0	13 21.6	27 1 53.0	+ 7 46.5	+1.0817	0.4912	0.2385	+77	+16
ϕ Aquarii	4.9	1.36	4.3	11 7.3	2 15.1	+ 8 8.0	-1.3032	0.4911	0.2388	-37	-90
58 Aquarii	6.4	+1.36	+4.4	-11 21.0	2 49.2	+ 8 41.2	-0.9154	0.4908	+0.2392	- 6	-90
70 Aquarii	6.1	1.25	5.1	11 0.8	12 10.0	- 6 13.3	+0.9840	0.4872	0.2461	+79	+ 8
81 Aquarii	6.4	1.16	4.6	7 31.6	19 26.0	+ 0 50.9	-1.0641	0.4850	0.2507	-13	-90
h Aquarii	5.4	1.15	5.0	8 9.7	21 33.2	+ 2 54.7	+0.1708	0.4844	0.2518	+53	-36
φ Aquarii	4.4	1.07	4.8	6 31.0	28 2 45.6	+ 7 58.8	-0.3295	0.4833	0.2544	+27	-63
96 Aquarii	5.7	+1.03	+4.7	- 5 35.9	5 38.6	+10 47.1	-0.6084	0.4827	+0.2558	+13	-83
317 B. Aquarii	6.3	1.03	5.1	6 22.9	6 23.2	+11 30.5	+0.4479	0.4826	0.2562	+70	-22
337 B. Aquarii	6.4	0.96	4.9	5 0.3	11 25.6	- 7 35.1	+0.2227	0.4822	0.2579	+57	-33
342 B. Aquarii	6.5	0.95	4.8	4 33.7	12 34.0	- 6 28.4	+0.0270	0.4821	0.2583	+46	-43
20 Piscium	5.6	0.87	5.3	3 14.6	21 57.9	+ 2 40.5	+1.0139	0.4818	0.2608	+87	+10
60 B. Piscium	6.0	+0.80	+4.6	- 0 22.4	29 1 53.0	+ 6 29.5	-1.1264	0.4820	+0.2614	-16	-90
80 B. Piscium	6.3	0.75	5.2	- 0 59.1	7 45.3	-11 47.5	+1.0853	0.4823	0.2622	+90	+14
98 B. Piscium	6.3	0.66	4.9	+ 1 12.4	14 59.8	- 4 44.5	+0.5742	0.4839	0.2622	+80	-15
44 Piscium	6.0	0.64	5.3	1 27.6	19 18.8	- 0 32.5	+1.4278	0.4847	0.2622	+90	+49
60 Piscium	6.2	0.48	4.6	6 16.1	30 7 38.1	+11 26.9	-0.6238	0.4887	0.2599	+12	-82
62 Piscium	6.1	+0.48	+4.5	+ 6 49.6	8 7.5	+11 55.4	-1.1071	0.4891	+0.2596	-16	-84
147 B. Piscium	5.9	0.51	4.6	4 50.1	8 8.9	+11 56.8	+1.0767	0.4891	0.2596	+90	+13
δ Piscium	4.6	0.47	4.4	7 6.8	8 20.6	-11 51.8	-1.3636	0.4892	0.2596	-40	-83
171 B. Piscium	6.3	0.43	5.1	6 0.9	14 30.6	- 5 51.9	+1.4299	0.4920	0.2573	+90	+55
ε Piscium	4.4	0.40	4.8	7 25.4	16 13.1	- 4 12.2	+0.3335	0.4928	0.2567	+63	-27
π Piscium	5.6	+0.25	+5.0	+11 41.9	31 10 31.7	-10 24.7	+0.3013	0.5035	+0.2459	+61	-27

JUNE.

20 H ¹ . Arietis	6.4	+0.12	+4.9	+16 49.1	1 3 2.5	+ 5 36.7	-1.2697	0.5158	+0.2308	-33	-74
19 Arietis	5.8	+0.12	+5.5	+14 52.4	4 53.7	+ 7 24.5	+1.2459	0.5174	0.2288	+90	+34
27 Arietis	6.4	0.05	5.6	17 19.3	13 38.3	- 8 7.3	+0.5760	0.5248	0.2180	+82	- 8
μ Arietis	5.7	+0.02	5.6	19 38.6	19 6.5	- 2 49.6	-0.7312	0.5296	0.2108	+ 5	-71
47 Arietis	5.8	-0.01	6.0	20 19.3	2 2 28.0	+ 4 17.5	+0.0552	0.5366	+0.1988	+48	-31
NEW MOON.											
47 Geminorum	5.6	+0.33	+8.7	+27 0.2	6 8 40.1	+ 6 33.5	+0.4832	0.5907	-0.0807	+77	+ 3
53 Geminorum	5.9	0.36	8.8	28 3.1	10 24.3	+ 8 13.5	-0.7325	0.5900	0.0862	+ 2	-62
134 B. Geminorum	6.5	0.36	8.5	26 51.0	10 50.7	+ 8 38.8	+0.4558	0.5899	0.0873	+74	0
59 Geminorum	5.7	0.39	8.7	27 48.6	13 43.2	+11 24.3	-0.7878	0.5888	0.0962	- 1	-63
ι Geminorum	3.9	+0.40	+8.7	+27 58.5	14 10.4	+11 50.4	-0.9995	0.5886	-0.0976	-16	-63
υ Geminorum	4.3	0.44	8.3	27 5.5	18 7.8	- 8 21.8	-0.5118	0.5871	0.1098	+16	-52
c Geminorum	5.5	0.47	8.0	25 59.6	21 20.0	- 5 17.3	+0.2385	0.5854	0.1192	+59	-13
φ Geminorum	5.0	0.52	8.0	26 59.6	7 0 59.6	- 1 46.4	-1.2339	0.5834	0.1294	-39	-64
ω Cancri	5.9	0.55	7.6	25 38.0	3 56.3	+ 1 3.2	-0.2463	0.5818	0.1380	+31	-40
4 Cancri	6.2	+0.55	+7.5	+25 19.9	4 15.6	+ 1 21.8	+0.0161	0.5817	-0.1387	+45	-27
ψ Cancri	5.9	0.60	7.2	25 46.4	7 42.9	+ 4 41.0	-0.9298	0.5796	0.1484	-10	-65
35 B. Cancri	6.4	0.59	6.7	23 24.1	9 2.3	+ 5 57.2	+1.2788	0.5788	0.1518	+90	+51
λ Cancri	5.9	0.64	6.8	24 17.9	11 45.8	+ 8 34.3	-0.0558	0.5769	0.1589	+41	-32
28 Cancri	6.1	0.68	6.6	24 26.2	15 1.1	+11 42.1	-0.7266	0.5748	0.1672	+ 4	-66
υ ¹ Cancri	5.7	+0.69	+6.5	+24 22.6	16 11.6	-11 10.1	-0.8656	0.5740	-0.1703	- 5	-66

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
JUNE.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
C. D.-28° 14268	6.4	+3.35	- 8.0	-28 55.4	18 9 11.6	- 3 8.1	+0.5106	0.5732	+0.0086	+45	-15
48 G. Sagittarii	6.3	3.33	7.6	28 19.2	11 24.9	- 0 59.8	-0.1049	0.5724	0.0152	+11	-51
62 B. Sagittarii	6.0	3.34	7.5	28 41.0	11 25.1	- 0 59.6	+0.2835	0.5724	0.0152	+32	-28
58 G. Sagittarii	6.1	3.34	7.1	28 28.3	13 18.2	+ 0 49.1	+0.0920	0.5717	0.0208	+22	-39
φ Sagittarii	3.3	3.32	5.1	27 4.9	23 4.9	+10 13.7	-1.0527	0.5677	0.0484	-38	-90
τ Sagittarii	3.5	+3.32	- 3.2	-27 48.0	19 7 59.8	- 5 11.2	+0.2569	0.5630	+0.0728	+35	-30
234 B. Sagittarii	5.9	3.31	1.6	28 2.1	15 28.8	+ 2 1.5	+1.1321	0.5581	0.0923	+62	+28
248 B. Sagittarii	5.7	3.27	- 1.2	27 9.9	17 48.6	+ 4 16.3	+0.4175	0.5566	0.0982	+47	-21
ω Sagittarii	4.8	3.23	+ 1.0	26 31.8	20 5 13.1	- 8 43.4	+1.0158	0.5482	0.1253	+64	+17
A Sagittarii	4.9	3.20	1.3	26 25.9	6 37.2	- 7 22.2	+1.0872	0.5471	0.1287	+64	+23
36 B. Capricorni	6.2	+3.03	+ 3.4	-22 40.8	20 38.8	+ 6 10.9	-0.9689	0.5357	+0.1579	-21	-90
17 Capricorni	5.8	2.94	4.6	21 49.8	21 4 30.8	-10 12.6	-0.5947	0.5294	0.1723	+ 2	-85
η Capricorni	4.8	2.82	5.7	20 11.9	13 22.0	- 1 38.2	-0.7823	0.5222	0.1873	- 6	-90
χ Capricorni	5.3	2.83	6.3	21 32.5	15 23.4	+ 0 19.4	+1.0718	0.5206	0.1906	+69	+18
27 Capricorni	6.1	2.81	6.2	20 54.3	15 52.9	+ 0 48.0	+0.4681	0.5202	0.1914	+60	-19
φ Capricorni	5.3	+2.82	+ 6.9	-21 0.7	18 54.3	+ 3 43.8	+1.1722	0.5178	+0.1962	+69	+26
128 B. Capricorni	6.5	2.71	7.6	19 31.5	22 2 9.5	+10 45.8	+1.0058	0.5123	0.2062	+71	+12
γ Capricorni	3.8	2.61	7.7	17 3.2	7 21.3	- 8 11.7	-0.6197	0.5085	0.2131	+ 6	-86
δ Capricorni	3.0	2.56	7.9	16 31.2	10 57.8	- 4 41.6	-0.4298	0.5061	0.2173	+17	-70
152 B. Capricorni	6.5	2.55	8.4	17 14.9	12 37.6	- 3 4.7	+0.7360	0.5050	0.2192	+73	- 5
ι Aquarii	4.4	+2.44	+ 8.8	-14 17.4	21 14.4	+ 5 17.2	-0.5940	0.4994	+0.2285	+10	-83
39 Aquarii	6.2	2.41	9.3	14 37.2	23 0 27.2	+ 8 24.5	+0.5106	0.4976	0.2316	+69	-18
42 Aquarii	5.5	2.36	9.2	13 15.8	2 49.6	+10 42.9	-0.4341	0.4962	0.2337	+19	-70
45 Aquarii	6.1	2.36	9.5	13 44.3	4 1.1	+11 52.4	+0.3695	0.4956	0.2348	+61	-25
50 Aquarii	5.9	2.33	9.9	13 58.1	6 58.8	- 9 14.9	+1.3231	0.4938	0.2376	+77	+38
182 B. Aquarii	6.2	+2.29	+10.0	-13 21.5	10 2.0	- 6 16.8	+1.3791	0.4924	+0.2398	+77	+46
σ Aquarii	4.9	2.24	9.4	11 7.2	10 24.0	- 5 55.4	-1.0048	0.4923	0.2401	-11	-90
58 Aquarii	6.4	2.24	9.5	11 20.9	10 58.1	- 5 22.2	-0.6163	0.4920	0.2405	+10	-84
70 Aquarii	6.1	2.17	10.5	11 0.7	20 18.4	+ 3 42.7	+1.2906	0.4878	0.2471	+79	+32
λ Aquarii	3.8	2.10	9.8	8 2.4	22 37.6	+ 5 58.2	-1.4213	0.4870	0.2483	-54	-90
81 Aquarii	6.4	+2.04	+10.1	- 7 31.5	24 3 34.5	+10 47.2	-0.7537	0.4852	+0.2511	+ 4	-90
82 Aquarii	6.4	2.03	10.0	7 2.3	4 13.6	+11 25.2	-1.1290	0.4850	0.2514	-18	-90
h Aquarii	5.4	2.03	10.5	8 9.6	5 41.7	-11 9.1	+0.4825	0.4845	0.2522	+71	-20
φ Aquarii	4.4	1.95	10.3	6 30.9	10 54.6	- 6 4.4	-0.0157	0.4832	0.2545	+43	-45
96 Aquarii	5.7	1.91	10.3	5 35.8	13 47.9	- 3 15.7	-0.2940	0.4825	0.2556	+29	-61
317 B. Aquarii	6.3	+1.90	+10.6	- 6 22.8	14 32.7	- 2 32.1	+0.7633	0.4824	+0.2558	+84	- 5
337 B. Aquarii	6.4	1.86	10.7	5 0.2	19 36.0	+ 2 23 1	+0 5393	0.4813	0.2576	+77	-17
342 B. Aquarii	6.5	1.86	10 6	4 33.6	20 44.6	+ 3 29 9	+0 3432	0.4812	0 2579	+64	-27
20 Piscium	5.6	1.75	11.0	3 14.5	25 6 10.7	-11 18.9	+1.3320	0.4805	0 2600	+87	+35
60 B. Piscium	6.0	1.67	10 2	0 22.3	10 7.1	- 7 28.7	-0.8140	0.4806	0 2604	+ 3	-90
80 B. Piscium	6.3	+1.61	+10.8	- 0 59.0	16 1.4	- 1 43.7	+1.4009	0.4809	+0.2608	+90	+45
98 B. Piscium	6.3	1.55	10.7	+ 1 12 5	23 18.8	+ 5 22.1	+0.8853	0.4818	0.2606	+90	0
60 Piscium	6.2	1.33	9.9	6 16.1	26 16 4.9	- 2 18.5	-0.3304	0.4862	0.2573	+28	-63
62 Piscium	6.1	1.32	9.7	6 49.7	16 34.6	- 1 49.6	-0.8160	0.4864	0.2572	+ 2	-84
147 B. Piscium	5.9	1.36	9.9	4 50.2	16 36.0	- 1 48.2	+1.3756	0.4864	0.2572	+90	+41
δ Piscium	4.6	+1.32	+ 9.6	+ 7 6.9	16 47.9	- 1 36.6	-1.0738	0.4864	+0.2571	-14	-83
ε Piscium	4.4	1.27	10.1	7 25 5	27 0 44.7	+ 6 7 2	+0.6202	0.4898	0.2540	+84	-12
π Piscium	5.6	1.09	9.7	11 42.0	19 13.8	+ 0 5.3	+0.5608	0.4999	0.2434	+79	-13
20 H ¹ . Arietis	6.4	0.92	8.6	16 49.1	28 11 54.0	- 7 43 9	-1.0454	0.5125	0.2276	-14	-74
27 Arietis	6.4	0.85	9.0	17 19.3	22 35.2	+ 2 37.5	+0.7849	0.5216	0.2148	+90	+ 3
μ Arietis	5.7	+0.79	+ 8.6	+19 38.6	29 4 5.8	+ 7 57.7	-0.5379	0.5267	+0.2073	+16	-65
47 Arietis	5.8	0.73	8.6	20 19.4	11 30.3	- 8 52.2	+0.2342	0.5339	0.1957	+58	-23
ε Arietis (mean)	4.6	0.72	8.5	20 59.7	12 2.0	- 8 21.5	-0.3791	0.5344	0.1949	+24	-54
ζ Arietis	5.0	0.69	8.8	20 43.5	19 14.6	- 1 23.4	+1.2709	0.5415	0.1828	+90	+45
66 Arietis	6.1	0.64	8.5	22 30.4	30 1 17.4	+ 4 26.8	+0.4513	0.5476	0.1707	+73	- 9
7 Tauri	5.9	+0.62	+ 8.2	+24 10.5	3 55.0	+ 6 58.9	-0.8682	0.5502	+0.1657	- 5	-66

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i> .	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>°</i>
16 Tauri	5.4	+0.59	+ 8.4	+24 1.1	80 8 25.9	+11 20.3	+0.0263	0.5547	+0.1562	+46	-29
17 Tauri	3.8	0.59	8.5	23 50.6	8 27.9	+11 22.2	+0.2167	0.5547	0.1562	+57	-19
18 Tauri	5.6	0.59	8.3	24 34.2	8 34.7	+11 28.7	-0.5305	0.5549	0.1559	+15	-58
<i>q</i> Tauri	4.3	0.59	8.4	24 11.9	8 36.2	+11 30.2	-0.1351	0.5550	0.1557	+37	-36
20 Tauri	4.1	0.59	8.4	24 5.9	8 52.4	+11 45.8	+0.0108	0.5552	0.1551	+45	-29
21 Tauri	5.8	+0.59	+ 8.4	+24 17.2	8 54.3	+11 47.7	-0.1813	0.5552	+0.1551	+34	-39
22 Tauri	6.5	0.59	8.4	24 15.6	8 58.0	+11 51.2	-0.1438	0.5553	0.1548	+36	-36
23 Tauri	4.3	0.59	8.5	23 40.8	9 5.7	+11 58.6	+0.4856	0.5555	0.1546	+76	- 5
<i>η</i> Tauri	3.0	0.58	8.5	23 50.4	9 35.5	-11 32.6	+0.3952	0.5559	0.1535	+69	-10
104 B. Tauri	5.5	0.58	8.6	23 9.4	9 58.4	-11 10.6	+1.1711	0.5563	0.1526	+90	+38
27 Tauri	3.7	+0.58	+ 8.5	+23 47.4	10 18.8	-10 50.9	+0.5565	0.5567	+0.1518	+82	+ 1
28 Tauri	5.2	0.58	8.5	23 52.4	10 19.4	-10 50.3	+0.4703	0.5567	0.1518	+75	- 5
14 H. Tauri	5.3	0.57	8.1	25 19.2	10 47 1	-10 23.6	-0.9802	0.5571	0.1507	-13	-65
<i>p</i> Tauri	5.6	0.53	8.2	26 15.4	19 26.4	- 2 3.3	-0.7370	0.5656	0.1308	+ 3	-64
ϕ Tauri	5.0	+0.52	+ 8.1	+27 8.7	23 21.9	+ 1 43.3	-1.1691	0.5694	+0.1209	-31	-63

JULY.

<i>χ</i> Tauri	5.3	+0.52	+ 8.5	+25 25.6	1 0 18.3	+ 2 37 7	+0.7363	0.5702	+0.1184	+90	+14
NEW MOON.											
8 Leonis	5.9	+0.83	+ 2.2	+16 49.7	6 2 49.4	+ 0 13.9	+1.0037	0.5615	-0.2337	+90	+18
107 B. Leonis	6.3	0.93	1.1	16 10.9	15 10.6	-11 51.6	-1.3626	0.5525	0.2531	-46	-74
34 Leonis	6.4	0.93	0.2	13 47.1	17 48.3	- 9 19.5	+0.3613	0.5506	0.2566	+65	-21
37 Leonis	5.5	+0.96	+ 0.1	+14 9.8	20 1.9	- 7 10.5	-0.5909	0.5491	-0.2595	+14	-72
<i>l</i> Leonis	5.3	1.06	- 2.1	11 0.3	7 10 43.6	+ 7 0.9	-1.3679	0.5399	0.2746	-42	-79
<i>χ</i> Leonis	4.7	1.09	3.7	7 48.3	18 1.0	- 9 56.3	-0.1860	0.5361	0.2797	+35	-53
σ Leonis	4.1	1.16	4.8	6 30.3	8 1 31.8	- 2 40.4	-0.9992	0.5328	0.2834	- 9	-83
80 Leonis	6.4	1.16	5.6	4 20.3	3 44.5	- 0 32.1	+0.5481	0.5320	0.2843	+78	-16
83 Leonis	6.3	+1.13	- 5.8	+ 3 29.2	4 12.4	- 0 5.1	+1.2713	0.5318	-0.2844	+90	+30
<i>r</i> Leonis	5.2	1.16	6.0	3 20.0	4 43.8	+ 0 25.3	+1.2752	0.5316	0.2846	+90	+30
89 Leonis	5.7	1.19	6.3	3 32.5	7 46.3	+ 3 21.9	+0.1995	0.5306	0.2855	+56	-34
β Virginis	3.8	1.29	7.4	2 15.2	15 28.9	+10 49.4	-0.7112	0.5283	0.2866	+ 8	-88
27 B. Virginis	6.5	1.30	8.0	+ 1 0.7	19 30.6	- 9 16.6	-0.6163	0.5275	0.2866	+13	-83
31 B. Virginis	6.4	+1.29	- 9.0	- 1 17.1	20 27.0	- 8 22.0	+1.4294	0.5273	-0.2865	+89	+51
162 B. Virginis	6.2	1.41	10.8	4 8.2	9 9 18.3	+ 4 4.5	+0.6466	0.5261	0.2835	+84	-11
200 B. Virginis	6.3	1.43	11.1	4 34.5	11 7.0	+ 5 49.7	+0.5779	0.5261	0.2828	+79	-15
<i>f</i> Virginis	6.0	1.45	11.6	5 21.3	13 34.9	+ 8 12.9	+0.6728	0.5262	0.2816	+84	-10
319 B. Virginis	6.3	1.51	12.1	5 49.7	18 44.4	-10 47.5	-0.2925	0.5264	0.2788	+28	-60
<i>g</i> Virginis	5.6	+1.62	-13.6	- 8 31.3	10 4 45.2	- 1 5.9	-0.3135	0.5278	-0.2716	+26	-62
50 Virginis	6.2	1.62	14.0	9 52.2	5 19.4	- 0 32.8	+0.9039	0.5280	0.2711	+80	+ 3
α Virginis	1.2	1.72	14.6	10 42.7	12 38.5	+ 6 32.1	-0.1961	0.5298	0.2643	+32	-56
<i>i</i> Virginis	5.7	1.72	15.2	12 15.6	13 21.5	+ 7 13.7	+1.1962	0.5300	0.2635	+78	+24
550 B. Virginis	6.0	1.77	15.5	12 46.4	17 5.9	+10 50.7	+0.7437	0.5311	0.2595	+77	- 6
86 Virginis	5.6	+1.85	-15.4	-11 59.7	22 22 9	- 8 2.6	-1.4084	0.5329	-0.2533	-61	-90
621 B. Virginis	6.4	1.97	16.4	14 33.5	11 6 57 2	+ 0 14.5	-0.9045	0.5363	0.2418	- 9	-90
214 G. Virginis	6.5	1.97	16.9	15 55.5	7 18.0	+ 0 34.7	+0.4162	0.5364	0.2414	+61	-23
40 H. Virginis	5.1	2.01	16.9	15 53.8	9 52.8	+ 3 4.3	-0.2308	0.5376	0.2376	+26	-57
43 H. Virginis	5.5	2.04	17.5	17 48.0	11 57.3	+ 5 4.7	+1.2406	0.5386	0.2344	+72	+31
17 G. Libræ	6.4	+2 27	-18.3	-20 48.8	12 1 49.8	- 5 31.3	+1.2640	0.5454	-0.2109	+69	+36
18 G. Libræ	6.1	2.28	18.3	20 57.9	2 17.5	- 5 4.5	+1.3252	0.5456	0.2100	+69	+45
43 B. Libræ	5.7	2.39	19.1	21 1.8	6 47.4	- 0 44.0	+0.4677	0.5479	0.2014	+58	-19
47 G. Libræ	6.1	2.42	18.2	21 41.9	10 47.1	+ 3 7.3	+0.3748	0.5499	0.1934	+52	-24
64 G. Libræ	5.8	2.49	18.0	22 5.0	15 7.6	+ 7 18.6	-0.0454	0.5523	0.1843	+29	-47
153 B. Libræ	6.3	+2.64	-18.1	-24 12.0	22 21.1	- 9 43.3	+0.8874	0.5560	-0.1683	+66	+ 6

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>°</i>
169 B. Libræ	6.0	+2.65	-17.6	-22 51.5	13 0 22.0	- 7 46.7	-0.8474	0.5568	-0.1637	-15	-90
177 B. Libræ	6.2	2.66	17.6	22 52.3	1 2.0	- 7 8.2	-0.9428	0.5573	0.1621	-21	-90
42 Libræ	5.0	2.68	17.7	23 32.5	1 25.1	- 6 46.0	-0.3054	0.5575	0.1612	+14	-63
<i>b</i> Scorpïi	4.7	2.77	17.8	25 29.6	5 56.9	- 2 24.0	+1.0306	0.5596	0.1503	+65	+17
<i>A</i> Scorpïi	4.6	2.79	17.6	25 4.4	7 4.3	- 1 19.0	+0.4241	0.5602	0.1476	+50	-21
31 B. Scorpïi	5.4	+2.78	-17.4	-24 16.8	7 12.3	- 1 11.3	-0.4262	0.5603	-0.1472	+ 6	-71
32 B. Scorpïi	5.3	2.77	17.2	23 43.4	7 13.6	- 1 10.1	-1.0111	0.5603	0.1472	-27	-90
3 Scorpïi	5.9	2.79	17.5	24 59.5	7 31.0	- 0 53.4	+0.2735	0.5604	0.1465	+42	-29
4 Scorpïi	5.7	2.81	17.8	26 0.9	7 51.6	- 0 33.5	+1.2958	0.5607	0.1456	+64	+50
40 B. Scorpïi	5.4	2.81	17.2	24 35.1	9 10.9	+ 0 42.9	-0.3918	0.5611	0.1424	+ 7	-69
π Scorpïi	3.0	+2.83	-17.6	-25 52.2	9 16.6	+ 0 48.4	+0.9397	0.5611	-0.1421	+64	+10
48 B. Scorpïi	4.9	2.86	17.3	25 37.7	11 10.7	+ 2 38.3	+0.4218	0.5620	0.1374	+49	-21
50 B. Scorpïi	6.4	2.85	17.0	24 29.5	11 25.9	+ 2 53.0	-0.8051	0.5621	0.1368	-16	-90
24 G. Scorpïi	6.2	2.87	16.8	24 14.1	13 5.9	+ 4 29.3	-1.3000	0.5628	0.1324	-59	-90
65 B. Scorpïi	5.5	2.90	17.2	26 5.9	13 10.5	+ 4 33.7	+0.6465	0.5628	0.1323	+61	- 8
85 B. Scorpïi	6.0	+2.93	-16.6	-25 15.7	16 1.7	+ 7 18.5	-0.5999	0.5640	-0.1249	- 5	-87
σ Scorpïi	3.1	2.97	16.4	25 23.4	18 39.4	+ 9 50.5	-0.7853	0.5651	0.1180	-16	-90
α Scorpïi	1.2	3.04	16.2	26 14.7	22 3.9	-10 52.7	-0.2732	0.5662	0.1090	+10	-61
116 B. Scorpïi	6.2	3.06	16.1	26 21.2	22 53.0	-10 5.4	-0.2467	0.5666	0.1068	+11	-59
134 B. Scorpïi	6.4	3.16	15.6	27 17.9	14 4 12.7	- 4 57.7	+0.2190	0.5682	0.0923	+34	-32
95 G. Ophiuchi	6.1	+3.32	-13.6	-27 39.5	15 46.5	+ 6 9.9	-0.2782	0.5705	-0.0596	+ 5	-62
43 Ophiuchi	5.4	3.39	12.9	28 3.8	20 15.1	+10 28.3	-0.0881	0.5710	0.0468	+13	-50
163 G. Ophiuchi	6.3	3.48	11.3	27 50.8	15 4 25.5	- 5 39.9	-0.6052	0.5710	0.0231	-15	-89
<i>X</i> Sagittarii (<i>var.</i>)	4.4	3.50	10.9	27 48.1	6 10.5	- 3 58.8	-0.6892	0.5709	0.0180	-20	-90
10 G. Sagittarii	5.7	3.55	10.2	28 3.3	9 55.3	- 0 22.6	-0.4670	0.5705	0.0071	- 9	-76
210 B. Scorpïi	5.8	+3.58	-10.1	-28 45.2	10 42.9	+ 0 23.3	+0.2736	0.5704	-0.0048	+29	-29
<i>W</i> Sagittarii (<i>var.</i>)	4.3	3.63	9.7	29 35.2	13 19.2	+ 2 53.7	+1.1629	0.5699	+0.0027	+60	+33
38 B. Sagittarii	4.7	3.60	9.2	28 28.2	14 36.1	+ 4 7.7	-0.0253	0.5697	0.0064	+13	-46
C. D. -28° 14268	6.4	3.63	9.0	28 55.4	16 11.9	+ 5 39.9	+0.4736	0.5693	0.0110	+42	-17
48 G. Sagittarii	6.3	3.64	8.5	28 19.2	18 26.8	+ 7 49.7	-0.1406	0.5688	0.0174	+ 8	-53
62 B. Sagittarii	6.0	+3.65	- 8.4	-28 41.1	18 27.0	+ 7 49.8	+0.2500	0.5688	+0.0174	+29	-30
58 G. Sagittarii	6.1	3.65	8.0	28 28.4	20 21.6	+ 9 40.1	+0.0618	0.5682	0.0229	+19	-41
ϕ Sagittarii	3.3	3.68	5.6	27 5.0	16 6 15.2	- 4 48.4	-1.0671	0.5646	0.0506	-41	-90
τ Sagittarii	3.5	3.74	3.7	27 48.0	15 15.7	+ 3 52.3	+0.2696	0.5604	0.0749	+35	-29
234 B. Sagittarii	5.9	3.78	1.8	28 2.1	22 48.8	+11 9.1	+1.1655	0.5560	0.0944	+62	+32
248 B. Sagittarii	5.7	+3.76	- 1.3	-27 9.9	17 1 9.8	-10 34.9	+0.4531	0.5546	+0.1002	+48	-19
ω Sagittarii	4.8	3.76	+ 1.4	26 31.8	12 39.2	+ 0 30.4	+1.0794	0.5468	0.1275	+63	+22
<i>A</i> Sagittarii	4.9	3.74	1.7	26 25.9	14 3.8	+ 1 52.1	+1.1539	0.5459	0.1306	+64	+29
36 B. Capricorni	6.2	3.61	4.6	22 40.8	18 4 9.7	- 8 30.5	-0.8766	0.5354	0.1602	-17	-90
17 Capricorni	5.8	3.56	6.2	21 49.7	12 3.4	- 0 52.2	-0.4835	0.5293	0.1749	+ 7	-75
η Capricorni	4.8	+3.48	+ 7.8	-20 11.9	20 56.0	+ 7 43.5	-0.6515	0.5225	+0.1899	0	-90
χ Capricorni	5.3	3.51	8.3	21 32.5	22 57.6	+ 9 41.4	+1.2107	0.5210	0.1931	+68	+30
27 Capricorni	6.1	3.50	8.3	20 54.2	23 27.2	+10 10.1	+0.6069	0.5206	0.1938	+66	-12
ϕ Capricorni	5.3	3.48	8.9	21 0.7	19 2 28.9	-10 53.9	+1.3188	0.5183	0.1985	+69	+44
128 B. Capricorni	6.5	3.41	10.1	19 31.5	9 44.6	- 3 51.5	+1.1673	0.5130	0.2086	+70	+25
γ Capricorni	3.8	+3.32	+10.6	-17 3.2	14 56.7	+ 1 11.4	-0.4496	0.5093	+0.2154	+14	-72
δ Capricorni	3.0	3.29	11.0	16 31.2	18 33.2	+ 4 41.4	-0.2519	0.5069	0.2198	+25	-59
152 B. Capricorni	6.5	3.29	11.5	17 14.9	20 13.1	+ 6 18.4	+0.9187	0.5058	0.2217	+73	+ 6
<i>i</i> Aquarii	4.4	3.17	12.3	14 17.3	20 4 49.9	- 9 19.6	-0.3959	0.5002	0.2308	+19	-68
39 Aquarii	6.2	3.15	12.9	14 37.1	8 2.7	- 6 12.3	+0.7158	0.4984	0.2339	+75	- 7
42 Aquarii	5.5	+3.10	+13.0	-13 15.7	10 25.2	- 3 53.8	-0.2255	0.4971	+0.2360	+28	-57
45 Aquarii	6.1	3.11	13.2	13 44.2	11 36.6	- 2 44.4	+0.5815	0.4964	0.2371	+72	-14
σ Aquarii	4.9	3.01	13.6	11 7.2	17 59.6	+ 3 28.0	-0.7834	0.4931	0.2422	+ 1	-90
58 Aquarii	6.4	3.02	13.7	11 20.9	18 33.6	+ 4 1.0	-0.3933	0.4927	0.2427	+21	-67
λ Aquarii	3.8	2.87	14.4	8 2.3	21 6 13.3	- 8 38.4	-1.1810	0.4875	0.2503	-24	-90
78 Aquarii	6.3	+2.86	+14.4	- 7 39.8	7 19.4	- 7 34.1	-1.3211	0.4871	+0.2509	-37	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
JULY.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"								
53 Aurigæ	5.6	+1.06	+ 7.0	+29 3.7	80 14 37.3	- 7 22.3	-0.8078	0.5967	-0.0454	- 3	-61
54 Aurigæ	5.8	1.05	7.1	28 20.6	15 4.3	- 6 56.4	-0.0988	0.5967	0.0469	+39	-23
28 Geminorum	5.5	+1.05	+ 6.9	+29 3.7	17 0.6	- 5 5.0	-0.9244	0.5969	-0.0533	-11	-61
NEW MOON.											

AUGUST.

c Leonis	5.1	+0.96	- 3.1	+ 6 34.1	4 0 15.9	- 1 49.8	+1.4235	0.5454	-0.2845	+90	+54
χ Leonis	4.7	0.98	3.1	7 48.3	2 11.5	+ 0 2.0	-0.3479	0.5445	0.2857	+27	-62
σ Leonis	4.1	+1.02	- 4.0	+ 6 30.3	9 29.0	+ 7 4.5	-1.1622	0.5412	-0.2895	-20	-83
80 Leonis	6.4	1.01	4.7	4 20.3	11 37.8	+ 9 8.9	+0.3590	0.5404	0.2903	+64	-26
83 Leonis	6.3	0.98	4.8	3 29.2	12 4.8	+ 9 35.0	+1.0711	0.5402	0.2904	+90	+14
τ Leonis	5.2	1.01	5.0	3 20.0	12 35.3	+10 4.5	+1.0740	0.5400	0.2906	+90	+14
89 Leonis	5.7	1.03	5.2	3 32.5	15 32.5	-11 4 2	+0.0092	0.5390	0.2915	+45	-43
9 B. Virginis	6.2	+1.04	- 6.6	+ 0 9.8	22 17.6	- 4 32.7	+1.3881	0.5368	-0.2923	+90	+43
β Virginis	3.8	1.11	6.3	2 15.2	23 1.4	- 3 50.4	-0.8994	0.5366	0.2923	- 2	-88
27 B. Virginis	6.5	1.10	6.8	+ 1 0.8	5 2 55.9	- 0 3.6	-0.8110	0.5357	0.2922	+ 3	-89
31 B. Virginis	6.4	1.08	7.5	- 1 17.0	3 50.7	+ 0 49.3	+1.2046	0.5355	0.2921	+89	+23
162 B. Virginis	6.2	1.17	9.3	4 8.2	16 20.0	-11 6.1	+0.4198	0.5337	0.2885	+68	-23
200 B. Virginis	6.3	+1.19	- 9.5	- 4 34.5	18 5.7	- 9 23.9	+0.3506	0.5337	-0.2877	+63	-26
f Virginis	6.0	1.21	10.0	5 21.3	20 29.5	- 7 4.8	+0.4422	0.5336	0.2864	+69	-22
319 B. Virginis	6.3	1.26	10.5	5 49.7	6 1 30.7	- 2 13.7	-0.5140	0.5336	0.2832	+18	-75
49 Virginis	5.2	1.34	12.5	10 16.7	10 57.7	+ 6 54.6	+1.3137	0.5343	0.2757	+80	+35
g Virginis	5.6	1.35	12.0	8 31.3	11 16.4	+ 7 12.7	-0.5401	0.5343	0.2754	+15	-77
50 Virginis	6.2	+1.35	-12.4	- 9 52.1	11 49.7	+ 7 45.0	+0.6630	0.5343	-0.2748	+80	-10
α Virginis	1.2	1.43	13.1	10 42.7	18 58.5	- 9 20.5	-0.4263	0.5356	0.2675	+20	-69
i Virginis	5.7	1.43	13.6	12 15.5	19 40.5	- 8 39.9	+0.9509	0.5358	0.2667	+78	+ 6
550 B. Virginis	6.0	1.48	14.0	12 46.3	23 20.1	- 5 7.7	+0.5032	0.5365	0.2624	+68	-18
621 B. Virginis	6.4	1.66	15.0	14 33.5	7 12 55.5	+ 8 0.3	-1.1283	0.5404	0.2436	-24	-90
214 G. Virginis	6.5	+1.66	-15.5	-15 55.4	13 15.9	+ 8 20.1	+0.1812	0.5406	-0.2431	+48	-35
40 H. Virginis	5.1	1.70	15.5	15 53.7	15 48.1	+10 47.1	-0.4596	0.5414	0.2391	+15	-72
43 H. Virginis	5.5	1.73	16.2	17 48.0	17 50.6	-11 14.6	+1.0008	0.5422	0.2358	+72	+11
231 G. Virginis	6.4	1.74	16.3	18 11.3	18 35.1	-10 31.6	+1.2216	0.5424	0.2346	+72	+29
236 G. Virginis	5.7	1.75	16.4	18 19.1	19 17.6	- 9 50.6	+1.1909	0.5427	0.2334	+72	+26
9 G. Libræ	6.5	+1.87	-17.0	-20 3.8	8 2 31.0	- 2 52.2	+1.3431	0.5455	-0.2207	+70	+47
17 G. Libræ	6.4	1.95	17.3	20 48.7	7 31.9	+ 1 58.2	+1.0336	0.5476	0.2113	+69	+14
18 G. Libræ	6.1	1.96	17.3	20 57.9	7 59.3	+ 2 24.7	+1.0948	0.5478	0.2104	+69	+19
43 B. Libræ	5.7	2.08	18.4	21 1.8	12 26.4	+ 6 42.4	+0.2458	0.5496	0.2014	+46	-31
47 G. Libræ	6.1	2.12	17.4	21 41.9	16 23.9	+10 31.5	+0.1565	0.5512	0.1931	+40	-36
64 G. Libræ	5.8	+2.19	-17.4	-22 5.0	20 42.4	- 9 19.2	-0.2582	0.5531	-0.1839	+19	-60
153 B. Libræ	6.3	2.35	17.8	24 12.0	9 3 53.5	- 2 23.6	+0.6782	0.5561	0.1675	+65	- 7
169 B. Libræ	6.0	2.36	17.2	22 51.5	5 53.8	- 0 27.6	-1.0495	0.5569	0.1627	-28	-90
177 B. Libræ	6.2	2.37	17.2	22 52.3	6 33.6	+ 0 10.7	-1.1442	0.5572	0.1612	-36	-90
42 Libræ	5.0	2.38	17.4	23 32.4	6 56.7	+ 0 32.9	-0.5081	0.5573	0.1603	+ 3	-78
b Scorpïi	4.7	+2.49	-17.7	-25 29.6	11 27.7	+ 4 54.1	+0.8296	0.5590	-0.1493	+64	+ 3
A Scorpïi	4.6	2.51	17.5	25 4.4	12 34.9	+ 5 58.9	+0.2256	0.5595	0.1465	+39	-32
31 B. Scorpïi	5.4	2.50	17.2	24 16.8	12 42.9	+ 6 6.6	-0.6230	0.5595	0.1461	- 4	-89
32 B. Scorpïi	5.3	2.49	17.0	23 43.4	12 44.2	+ 6 7.8	-1.2067	0.5595	0.1461	-44	-90
3 Scorpïi	5.9	2.51	17.4	24 59.5	13 1.5	+ 6 24.4	+0.0758	0.5596	0.1454	+31	-40
4 Scorpïi	5.7	+2.52	-17.7	-26 0.9	13 22.1	+ 6 44.3	+1.0966	0.5597	-0.1445	+64	+23
40 B. Scorpïi	5.4	2.54	17.1	24 35.1	14 41.3	+ 8 0.6	-0.5869	0.5602	0.1412	- 3	-85
π Scorpïi	3.0	2.56	17.6	25 52.2	14 47.0	+ 8 6.1	+0.7428	0.5602	0.1409	+64	- 3
48 B. Scorpïi	4.9	2.59	17.3	25 37.7	16 40.9	+ 9 55.8	+0.2279	0.5609	0.1361	+38	-32
50 B. Scorpïi	6.4	2.58	16.9	24 29.5	16 56.2	+10 10.6	-0.9971	0.5610	0.1355	-28	-90
65 B. Scorpïi	5.5	+2.64	-17.3	-26 5.9	18 40.7	+11 51.2	+0.4546	0.5616	-0.1310	+50	-19

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>°</i>
85 B. Scorpii	6.0	+2.67	-16.7	-25 15.7	9 21 31.9	- 9 24.0	-0.7874	0.5625	-0.1236	-16	-90
δ Scorpii	3.1	2.73	16.5	25 23.4	10 0 9.8	- 6 51.8	-0.9700	0.5633	0.1166	-28	-90
α Scorpii	1.2	2.80	16.4	26 14.7	3 34.6	- 3 34.6	-0.4541	0.5642	0.1075	+ 1	-74
116 B. Scorpii	6.2	2.82	16.3	26 21.2	4 23.8	- 2 47.3	-0.4265	0.5645	0.1052	+ 2	-72
τ Scorpii	2.9	2.88	16.6	28 2.5	6 14.4	- 1 0.8	+1.1630	0.5649	0.1002	+62	+31
134 B. Scorpii	6.4	+2.93	-15.9	-27 17.9	9 44.5	+ 2 21.5	+0.0457	0.5656	-0.0906	+24	-42
135 B. Scorpii	6.0	2.96	16.2	28 21.2	10 1.1	+ 2 37.4	+1 1349	0.5657	0.0898	+62	+28
95 G. Ophiuchi	6.1	3.14	14.3	27 39.6	21 21.6	-10 27.6	-0.4371	0.5672	0.0580	- 3	-73
43 Ophiuchi	5.4	3.23	13.7	28 3.8	11 52.0	- 6 7.4	-0.2407	0.5674	0.0451	+ 6	-59
163 G. Ophiuchi	6.3	3.36	12.2	27 50.8	10 6.1	+ 1 48.1	-0.7481	0.5671	0.0215	-23	-90
X Sagittarii (<i>var.</i>)	4.4	+3.38	-11.9	-27 48.1	11 52.0	+ 3 30.0	-0.8298	0.5669	-0.0164	-28	-90
10 G. Sagittarii	5.7	3.45	11.1	28 3.3	15 38.7	+ 7 8.2	-0.6019	0.5664	0.0056	-16	-89
210 B. Scorpii	5.8	3.48	11.2	28 45.2	16 26.8	+ 7 54.5	+0.1420	0.5663	-0.0033	+22	-36
W Sagittarii (<i>var.</i>)	4.3	3.54	10.9	29 35.3	19 4.5	+10 26.3	+1.0380	0.5658	+0.0042	+60	+20
38 B. Sagittarii	4.7	3.53	10.3	28 28.2	20 22.2	+11 41.1	-0.1521	0.5655	0.0079	+ 7	-54
C. D.-28° 14268	6.4	+3.57	-10.1	-28 55.4	21 58.8	-10 45.9	+0.3507	0.5651	+0.0124	+34	-24
48 G. Sagittarii	6.3	3.59	9.6	28 19.2	12 0 15.1	- 8 34.6	-0.2623	0.5645	0.0188	+ 2	-60
62 B. Sagittarii	6.0	3.60	9.6	28 41.1	0 15.3	- 8 34.5	+0.1297	0.5645	0.0188	+22	-37
58 G. Sagittarii	6.1	3.61	9.1	28 28.4	2 10.9	- 6 43.1	-0.0563	0.5640	0.0243	+13	-48
ϕ Sagittarii	3.3	3.69	6.6	27 5.0	12 10.7	+ 2 54.6	-1.1746	0.5604	0.0518	-49	-90
τ Sagittarii	3.5	+3.81	- 4.8	-27 48.0	21 16.9	+11 41.0	+0.1812	0.5561	+0.0760	+30	-34
183 B. Sagittarii	6.2	3.85	4.9	28 46.4	21 30.6	+11 54.2	+1.2523	0.5560	0.0766	+61	+46
234 B. Sagittarii	5.9	3.88	2.9	28 2.1	13 4 54.8	- 4 57.4	+1.0927	0.5520	0.0954	+62	+24
248 B. Sagittarii	5.7	3.88	- 2.2	27 9.9	7 17.4	- 2 39.9	+0.3813	0.5507	0.1012	+43	-23
ω Sagittarii	4.8	3.94	+ 0.5	26 31.9	18 53.9	+ 8 32.5	+1.0289	0.5433	0.1284	+63	+17
A Sagittarii	4.9	+3.94	+ 0.9	-26 25.9	20 19.4	+ 9 55.1	+1.1061	0.5424	+0.1315	+64	+24
36 B. Capricorni	6.2	3.86	4.6	22 40.8	14 10 33.1	- 0 19.7	-0.9079	0.5325	0.1610	-18	-90
17 Capricorni	5.8	3.86	6.4	21 49.8	18 30.9	+ 7 22.7	-0.4996	0.5268	0.1759	+ 6	-77
η Capricorni	4.8	3.82	8.3	20 11.8	15 3 27.4	- 7 57.5	-0.6524	0.5205	0.1909	0	-90
χ Capricorni	5.3	3.86	8.6	21 32.5	5 29.9	- 5 58.8	+1.2193	0.5190	0.1941	+68	+31
27 Capricorni	6.1	+3.85	+ 8.8	-20 54.2	5 59.7	- 5 29.9	+0.6145	0.5187	+0.1949	+66	-11
ϕ Capricorni	5.3	3.85	9.4	21 0.6	9 2.6	- 2 32.6	+1.3339	0.5166	0.1996	+69	+47
30 Capricorni	5.4	3.77	9.8	18 20.8	10 14.8	- 1 22.6	-1.3579	0.5158	0.2013	-57	-90
128 B. Capricorni	6.5	3.80	10.9	19 31.5	16 20.9	+ 4 32.4	+1.1945	0.5117	0.2099	+70	+27
γ Capricorni	3.8	3.73	11.9	17 3.1	21 34.6	+ 9 36.8	-0.4176	0.5083	0.2167	+16	-70
δ Capricorni	3.0	+3.72	+12.4	-16 31.1	16 1 12.1	-10 52.1	-0.2129	0.5060	+0.2211	+27	-56
152 B. Capricorni	6.5	3.72	12.8	17 14.9	2 52.4	- 9 14.7	+0.9636	0.5050	0.2230	+73	+ 8
ι Aquarii	4.4	3.63	14.2	14 17.3	11 31.2	- 0 50.8	-0.3391	0.4998	0.2323	+22	-64
39 Aquarii	6.2	3.63	14.8	14 37.1	14 44.7	+ 2 17.2	+0.7807	0.4981	0.2354	+75	- 3
42 Aquarii	5.5	3.60	15.1	13 15.7	17 7.6	+ 4 36.1	-0.1586	0.4968	0.2376	+32	-53
45 Aquarii	6.1	+3.60	+15.3	-13 44.2	18 19.2	+ 5 45.7	+0.6520	0.4962	+0.2386	+75	-11
σ Aquarii	4.9	3.52	16.1	11 7.1	17 0 43.1	+11 59.0	-0.7048	0.4931	0.2439	+ 5	-90
58 Aquarii	6.4	3.53	16.2	11 20.8	1 17.2	-11 27.8	-0.3130	0.4928	0.2443	+25	-62
λ Aquarii	3.8	3.42	17.5	8 2.3	12 58.2	- 0 5.9	-1.0832	0.4879	0.2520	-16	-90
78 Aquarii	6.3	3.41	17.6	7 39.7	14 4.4	+ 0 58.5	-1.2219	0.4875	0.2526	-27	-90
81 Aquarii	6.4	+3.40	+18.1	- 7 31.4	17 55.6	+ 4 43.5	-0.3986	0.4862	+0.2546	+23	-67
82 Aquarii	6.4	3.38	18.1	7 2.2	18 34.8	+ 5 21.7	-0.7731	0.4860	0.2550	+ 4	-90
h Aquarii	5.4	3.41	18.4	8 9.5	20 3.2	+ 6 47.7	+0.8487	0.4855	0.2556	+82	0
ϕ Aquarii	4.4	3.35	18.7	6 30.8	18 1 16.7	+11 52.8	+0.3634	0.4841	0.2578	+64	-26
96 Aquarii	5.7	3.33	19.0	5 35.7	4 10.5	- 9 17.9	+0.0914	0.4833	0.2588	+49	-40
316 B. Aquarii	6.5	+3.32	+18.8	- 4 23.3	4 40.2	- 8 49.0	-1.1210	0.4832	+0.2590	-18	-90
317 B. Aquarii	6.3	3.33	19.1	6 22.7	4 55.5	- 8 34.2	+1.1555	0.4831	0.2591	+84	+19
337 B. Aquarii	6.4	3.30	19.4	5 0.1	9 59 7	- 3 38.0	+0.9435	0.4821	0.2605	+85	+ 5
342 B. Aquarii	6.5	3.29	19.4	4 33.4	11 8.5	- 2 31.0	+0.7493	0.4819	0.2608	+85	- 6
60 B. Piscium	6.0	3.16	20.0	0 22.1	19 0 34.7	+10 34.2	-0.3850	0.4804	0.2626	+25	-66
98 B. Piscium	6.3	+3.08	+20.7	+ 1 12.7	13 52.1	- 0 29.2	+1.3475	0.4806	+0.2618	+90	+37

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	
		$\Delta\alpha$	$\Delta\delta$							
		s	"	° ' "	d h m	h m				
60	Piscium	6.2	+2.95	+20.5	+ 6 16.3	20 6 49.7	- 7 58.4	+0.1404	0.4834	+0.2572
62	Piscium	6.1	2 95	20.4	6 49.8	7 19.8	- 7 29.1	-0.3495	0.4836	0.2570
δ	Piscium	4.6	2.94	20.3	7 7.0	7 33.2	- 7 16.1	-0.6096	0.4836	0.2569
ε	Piscium	4.4	2.90	20.6	7 25.7	15 37.4	+ 0 35.2	+1.1054	0.4860	0.2532
π	Piscium	5.6	2.78	19.8	11 42.1	21 10 29.0	- 5 4.2	+1.0466	0.4941	0.2406
20 H ¹ .	Arietis	6.4	+2.68	+18.2	+16 49.3	22 3 35.7	+11 33.3	-0.5964	0.5043	+0.2240
26	Arietis	6.2	2.62	17.2	19 28.5	14 27.3	- 1 54.5	-1.1300	0.5120	0.2108
27	Arietis	6.4	2.61	17.9	17 19.5	14 37.0	- 1 45.1	+1.2498	0.5122	0.2106
μ	Arietis	5.7	2.58	17.0	19 38.8	20 18.8	+ 3 46.2	-0.1038	0.5166	0.2027
47	Arietis	5.8	2.54	16.6	20 19.5	23 3 59.2	+11 12.3	+0.6686	0.5228	0.1910
ε	Arietis (<i>mean</i>)	4.6	+2.53	+16.3	+20 59.8	4 32.0	+11 43.9	+0.0435	0.5233	+0.1902
66	Arietis	6.1	2.44	15.2	22 30.5	18 17.9	+ 1 3.0	+0.8614	0.5352	0.1659
7	Tauri	5.9	2.44	14.5	24 10.6	21 1.6	+ 3 41.2	-0.4890	0.5376	0.1606
11	Tauri	6.1	2.42	14.1	25 3.2	23 53.4	+ 6 27.2	-0.9773	0.5403	0.1548
16	Tauri	5.4	2.40	14.3	24 1.2	24 1 43.4	+ 8 13.5	+0.4116	0.5420	0.1511
17	Tauri	3.8	+2.40	+14.4	+23 50.7	1 45.5	+ 8 15.6	+0.6056	0.5420	+0.1510
18	Tauri	5.6	2.40	14.1	24 34.3	1 52.6	+ 8 22.4	-0.1561	0.5420	0.1507
q	Tauri	4.3	2.40	14.2	24 11.9	1 54.2	+ 8 23.9	+0.2468	0.5420	0.1506
20	Tauri	4.1	2.40	14.3	24 6.0	2 11.0	+ 8 40.2	+0.3945	0.5423	0.1501
21	Tauri	5.8	2.40	14.2	24 17.3	2 13.0	+ 8 42.1	+0.1990	0.5423	0.1500
22	Tauri	6.5	+2.40	+14.2	+24 15.7	2 16.8	+ 8 45.8	+0.2368	0.5424	+0.1499
23	Tauri	4.3	2.39	14.4	23 40.9	2 24.8	+ 8 53.5	+0.8778	0.5425	0.1496
η	Tauri	3.0	2.39	14.3	23 50.4	2 55.8	+ 9 23.5	+0.7844	0.5429	0.1485
27	Tauri	3.7	2.38	14.3	23 47.5	3 40.9	+10 7.0	+0.9472	0.5436	0.1469
28	Tauri	5.2	2.39	14.3	23 52.5	3 41.5	+10 7.6	+0.8592	0.5436	0.1469
14 H.	Tauri	5.3	+2.40	+13.7	+25 19.3	4 10.3	+10 35.4	-0.6198	0.5441	+0.1458
p	Tauri	5.6	2.33	12.8	26 15.5	13 10.7	- 4 43.2	-0.3942	0.5521	0.1256
φ	Tauri	5.0	2.31	12.2	27 8.8	17 15.9	- 0 46.8	-0.8448	0.5557	0.1159
χ	Tauri	5.3	2.29	12.8	25 25.7	18 14.5	+ 0 9.7	+1.0934	0.5565	0.1134
17 B.	Aurigæ	6.0	2.21	10.9	27 45.3	25 6 50.9	-11 42.0	-0.1465	0.5669	0.0807
38 B.	Aurigæ	6.5	+2.16	+10.5	+27 34.7	11 41.6	- 7 2.3	+0.3986	0.5706	+0.0672
47 B.	Aurigæ	6.0	2.15	10.2	27 55.5	13 45.6	- 5 3.0	+0.1676	0.5721	0.0614
354 B.	Tauri	6.4	2.10	9.8	27 52.4	18 16.9	- 0 42.3	+0.4688	0.5752	0.0482
73 B.	Aurigæ	5.8	2.12	9.2	29 29.1	18 20.6	- 0 38.7	-1.2151	0.5752	0.0481
22	Aurigæ	6.4	2.11	9.4	28 51.4	19 13.2	+ 0 11.9	-0.5171	0.5758	0.0455
β	Tauri	1.8	+2.10	+ 9.3	+28 32.2	20 23.2	+ 1 19.1	-0.1316	0.5765	+0.0420
107 B.	Aurigæ	6.5	2.05	9.2	27 36.5	26 0 13.5	+ 5 0.4	+0.9755	0.5789	0.0305
116 B.	Aurigæ	5.9	2.06	8.6	29 10.1	1 31.8	+ 6 15.6	-0.6118	0.5796	0.0265
406 B.	Tauri	5.6	2.00	8.6	27 56.7	6 7.8	+10 40.7	+0.7488	0.5821	0.0123
136	Tauri	4.6	1.98	8.6	27 35.7	7 3.4	+11 34.1	+1.1218	0.5825	0.0095
154 B.	Aurigæ	6.4	+1.99	+ 8.0	+28 55.9	8 17.8	-11 14.5	-0.2550	0.5831	+0.0056
415 B.	Tauri	6.1	1.95	8.3	27 34.3	10 3.0	- 9 33.5	+1.1587	0.5839	+0.0001
183 B.	Aurigæ	6.3	1.96	7.4	29 31.3	12 6.0	- 7 35.5	-0.8665	0.5848	-0.0064
κ	Aurigæ	4.4	1.93	6.8	29 32.0	15 35.2	- 4 14.7	-0.9170	0.5862	0.0175
211 B.	Aurigæ	6.3	1.91	6.8	29 35.0	17 49.6	- 2 5.8	-1.0142	0.5868	0.0246
49	Aurigæ	5.1	+1.85	+ 6.6	+28 5.6	23 14.1	+ 3 5.5	+0.3385	0.5882	-0.0420
53	Aurigæ	5.6	1.85	6.2	29 3.7	27 0 26.4	+ 4 14.9	-0.7077	0.5885	0.0459
54	Aurigæ	5.8	1.84	6.4	28 20.6	0 54.0	+ 4 41.3	+0.0079	0.5886	0.0473
28	Geminorum	5.5	1.83	5.9	29 3.7	2 53.0	+ 6 35.5	-0.8279	0.5889	0.0537
47	Geminorum	5.6	1.72	5.3	27 0.1	13 6.2	- 7 36.4	+0.5562	0.5895	0.0865
53	Geminorum	5.9	+1.71	+ 4.9	+28 3.1	14 50.1	- 5 56.7	-0.6640	0.5894	-0.0920
134 B.	Geminorum	6.5	1.69	5.0	26 50.9	15 16.4	- 5 31.5	+0.5159	0.5894	0.0934
59	Geminorum	5.7	1.68	4.6	27 48.5	18 8.0	- 2 46.9	-0.7369	0.5892	0.1024
ι	Geminorum	3.9	1.67	4.4	27 58.4	18 35.1	- 2 20.9	-0.9501	0.5891	0.1038
δ ²	Geminorum	5.0	1.66	4.2	28 5.9	20 8.8	- 0 51.0	-1.2409	0.5889	0.1087
ν	Geminorum	4.3	+1.63	+ 4.2	+27 5.5	22 30.5	+ 1 24.9	-0.4875	0.5886	-0.1160

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
c Geminorum	5.5	+1.59	+ 4.1	+25 59.6	28 1 40.5	+ 4 27.2	+0.2383	0.5879	-0.1257	+59	-13
φ Geminorum	5.0	1.58	3.5	26 59.6	5 16.9	+ 7 54.8	-1.2405	0.5871	0.1365	-40	-63
ω Cancrī	5.9	1.53	3.4	25 38.0	8 10.6	+10 41.4	-0.2798	0.5862	0.1451	+29	-41
4 Cancrī	6.2	1.52	3.5	25 19.8	8 29.5	+10 59.6	-0.0225	0.5861	0.1460	+43	-28
ψ Cancrī	5.9	1.50	2.8	25 46.4	11 52.7	- 9 45.3	-0.9762	0.5850	0.1558	-13	-64
35 B. Cancrī	6.4	+1.47	+ 3.3	+23 24.1	13 10.3	- 8 30.9	+1.1952	0.5845	-0.1595	+90	+42
λ Cancrī	5.9	1.46	2.8	24 17.9	15 50.0	- 5 57.6	-0.1370	0.5835	0.1669	+37	-36
28 Cancrī	6.1	1.44	2.4	24 26.1	19 0.2	- 2 55.0	-0.8161	0.5822	0.1756	- 1	-66
ν ¹ Cancrī	5.7	1.43	2.3	24 22.5	20 8.8	- 1 49.1	-0.9590	0.5817	0.1787	-11	-66
ν ² Cancrī	6.4	1.43	2.2	24 22.9	20 44.0	- 1 15.3	-1.0705	0.5814	0.1803	-19	-66
γ Cancrī	4.7	+1.36	+ 2.2	+21 47.0	29 0 50.3	+ 2 41.3	+0.7565	0 5796	-0.1909	+90	+ 8
NEW MOON.											

SEPTEMBER.

f Virginis	6.0	+1.05	- 8.8	- 5 21.3	2 5 39.6	+ 3 53.2	+0.3422	0.5424	-0.2921	+63	-27
319 B. Virginis	6.3	1.08	9.3	5 49.7	10 31.4	+ 8 35.0	-0.6046	0.5426	0.2890	+12	-82
49 Virginis	5.2	1.11	10.9	10 16.7	19 40.2	- 6 35.0	+1.1879	0.5436	0.2813	+80	+23
9 Virginis	5.6	1.13	10.6	8 31.3	19 58.3	- 6 17.4	-0.6377	0.5436	0.2810	+10	-85
50 Virginis	6.2	+1.12	-10.9	- 9 52.1	20 30.5	- 5 46.3	+0.5464	0.5437	-0.2804	+73	-17
α Virginis	1.2	1.18	11.6	10 42.6	3 25.3	+ 0 54.2	-0.5307	0.5450	0.2729	+15	-77
i Virginis	5.7	1.17	12.0	12 15.5	4 5.9	+ 1 33.4	+0.8246	0.5452	0.2721	+78	- 1
550 B. Virginis	6.0	1.21	12.3	12 46.3	7 38.3	+ 4 58.4	+0.3818	0.5460	0.2676	+61	-25
621 B. Virginis	6.4	1.35	13.4	14 33.5	20 46.9	- 6 20.6	-1.2305	0.5497	0.2483	-33	-90
214 G. Virginis	6.5	+1.35	-13.8	-15 55.4	21 6.7	- 6 1.4	+0.0590	0.5498	-0.2477	+41	-41
40 H. Virginis	5.1	1.38	13.9	15 53.7	23 34.0	- 3 39.3	-0.5730	0.5506	0.2436	+ 9	-81
43 H. Virginis	5.5	1.40	14.5	17 48.0	4 1 32.5	- 1 45.0	+0.8648	0.5512	0.2401	+72	+ 2
231 G. Virginis	6.4	1.41	14.6	18 11.1	2 15.6	- 1 3.5	+1.0821	0.5515	0.2389	+72	+17
236 G. Virginis	5.7	1.41	14.7	18 19.0	2 56.8	- 0 23.7	+1.0518	0.5517	0.2377	+72	+15
9 G. Libræ	6.5	+1.52	-15.4	-20 3.7	9 56.6	+ 6 21.0	+1.2008	0.5542	-0.2245	+70	+28
17 G. Libræ	6.4	1.58	15.8	20 48.7	14 48.4	+11 2.3	+0.8956	0.5560	0.2147	+69	+ 5
18 G. Libræ	6.1	1.59	15.8	20 57.9	15 15.0	+11 28.0	+0.9559	0.5561	0.2138	+69	+ 9
43 B. Libræ	5.7	1.71	17.0	21 1.7	19 34.2	- 8 22.2	+0.1188	0.5576	0.2045	+39	-38
47 G. Libræ	6.1	1.73	16.1	21 41.9	23 25.0	- 4 39.9	+0.0306	0.5591	0.1960	+34	-43
64 G. Libræ	5.8	+1.79	-16.1	-22 4.9	5 3 36.3	- 0 37.7	-0.3784	0.5606	-0.1864	+12	-68
153 B. Libræ	6.3	1.92	16.7	24 12.0	10 36.1	+ 6 6.6	+0.5468	0.5629	0.1695	+59	-15
169 B. Libræ	6.0	1.95	16.2	22 51.5	12 33.4	+ 7 59.6	-1.1595	0.5635	0.1646	-37	-90
177 B. Libræ	6.2	1.96	16.1	22 52.2	13 12.3	+ 8 37.0	-1.2529	0.5638	0.1630	-47	-90
42 Libræ	5.0	1.97	16.3	23 32.4	13 34.8	+ 8 58.6	-0.6245	0.5639	0.1621	- 3	-89
b Scorpīi	4.7	+2.07	-16.8	-25 29.5	17 59.2	-10 46.8	+0.6982	0.5652	-0.1507	+64	- 6
A Scorpīi	4.6	2.08	16.6	25 4.4	19 5.0	- 9 43.5	+0.1015	0.5655	0.1479	+32	-39
31 B. Scorpīi	5.4	2.08	16.3	24 16.8	19 12.7	- 9 36.0	-0.7374	0.5655	0.1476	-10	-90
32 B. Scorpīi	5.3	2.09	16.1	23 43.4	19 14.0	- 9 34.8	-1.3145	0.5655	0.1475	-62	-90
3 Scorpīi	5.9	2.09	16.6	24 59.5	19 31.0	- 9 18.5	-0.0466	0.5656	0.1468	+25	-47
4 Scorpīi	5.7	+2.10	-16.9	-26 0.9	19 51.1	- 8 59.1	+0.9627	0.5657	-0.1459	+64	+12
40 B. Scorpīi	5.4	2.12	16.3	24 35.1	21 8.5	- 7 44.6	-0.7014	0.5660	0.1425	- 9	-90
π Scorpīi	3.0	2.13	16.8	25 52.1	21 14.1	- 7 39.2	+0.6134	0.5661	0.1423	+60	-10
48 B. Scorpīi	4.9	2.16	16.6	25 37.7	23 5.5	- 5 52.0	+0.1047	0.5665	0.1373	+32	-39
50 B. Scorpīi	6.4	2.16	16.1	24 29.5	23 20.4	- 5 37.7	-1.1069	0.5666	0.1366	-36	-90
65 B. Scorpīi	5.5	+2.21	-16.6	-26 5.9	6 1 2.7	- 3 59.3	+0.3296	0.5670	-0.1320	+43	-26
85 B. Scorpīi	6.0	2.25	16.1	25 15.7	3 50.4	- 1 18.0	-0.8987	0.5676	0.1244	-22	-90
σ Scorpīi	3.1	2.30	15.9	25 23.4	6 25.1	+ 1 11.0	-1.0790	0.5681	0.1174	-36	-90
α Scorpīi	1.2	2.38	15.9	26 14.7	9 46.0	+ 4 24.2	-0.5675	0.5687	0.1080	- 5	-84
116 B. Scorpīi	6.2	2.39	15.9	26 21.2	10 34.4	+ 5 10.7	-0.5400	0.5688	0.1058	- 4	-82
τ Scorpīi	2.9	+2.45	-16.3	-28 2.5	12 23.0	+ 6 55.2	+1.0353	0.5691	-0.1007	+62	+19

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i> .	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		s	"	° '	d h m	h m				°	°
134 B. Scorpii	6.4	+2.51	-15.7	-27 17.9	6 15 49.5	+10 13.9	-0.0705	0.5695	-0.0909	+19	-49
135 B. Scorpii	6.0	2.53	16.0	28 21.2	16 5.9	+10 29.6	+1.0092	0.5695	0.0901	+62	+17
95 G. Ophiuchi	6.1	2.74	14.5	27 39.6	7 3 16.5	- 2 45.3	-0.5454	0.5697	0.0578	- 9	-83
43 Ophiuchi	5.4	2.83	14.0	28 3.8	7 43.7	+ 1 31.8	-0.3488	0.5695	0.0448	0	-67
163 G. Ophiuchi	6.3	2.98	12.7	27 50.8	15 52.8	+ 9 22.2	-0.8499	0.5683	0.0210	-29	-90
X Sagittarii (<i>var.</i>)	4.4	+3.01	-12.4	-27 48.1	17 37.9	+11 3.4	-0.9305	0.5680	-0.0160	-34	-90
10 G. Sagittarii	5.7	3.09	11.8	28 3.3	21 22.8	- 9 20.3	-0.7023	0.5670	0.0051	-22	-90
210 B. Scorpii	5.8	3.12	11.9	28 45.2	22 10.5	- 8 34.4	+0.0382	0.5668	-0.0029	+16	-42
W Sagittarii (<i>var.</i>)	4.3	3.18	11.7	29 35.3	8 0 47.3	- 6 3.5	+0.9313	0.5661	+0.0047	+60	+12
38 B. Sagittarii	4.7	3.18	11.1	28 28.2	2 4.5	- 4 49.2	-0.2527	0.5657	0.0084	+ 2	-60
C. D.-28° 14268	6.4	+3.22	-11.0	-28 55.4	3 40.6	- 3 16.7	+0.2487	0.5652	+0.0130	+29	-30
48 G. Sagittarii	6.3	3.24	10.5	28 19.2	5 56.2	- 1 6.1	-0.3605	0.5644	0.0194	- 3	-67
62 B. Sagittarii	6.0	3.25	10.4	28 41.1	5 56.4	- 1 5.9	+0.0300	0.5644	0.0194	+17	-43
58 G. Sagittarii	6.1	3.28	10.0	28 28.4	7 51.5	+ 0 44.8	-0.1544	0.5636	0.0248	+ 9	-54
ϕ Sagittarii	3.3	3.39	7.6	27 5.0	17 49.6	+10 20.8	-1.2644	0.5593	0.0524	-60	-90
τ Sagittarii	3.5	+3.54	- 6.1	-27 48.0	9 2 55.6	- 4 52.9	+0.0932	0.5545	+0.0764	+26	-39
183 B. Sagittarii	6.2	3.58	6.2	28 46.4	3 9.3	- 4 39.7	+1.1625	0.5544	0.0770	+61	+32
234 B. Sagittarii	5.9	3.65	4.4	28 2.1	10 34.2	+ 2 29.4	+1.0084	0.5499	0.0957	+62	+16
248 B. Sagittarii	5.7	3.65	3.6	27 9.9	12 57.0	+ 4 47.1	+0.2992	0.5484	0.1015	+39	-28
ω Sagittarii	4.8	3.77	0.8	26 31.9	10 0 35.9	- 7 58.1	+0.9545	0.5407	0.1285	+63	+12
λ Sagittarii	4.9	+3.77	- 0.5	-26 25.9	2 1.7	- 6 35.2	+1.0327	0.5397	+0.1316	+64	+17
36 B. Capricorni	6.2	3.78	+ 3.5	22 40.8	16 19.8	+ 7 14.5	-0.9722	0.5297	0.1610	-22	-90
17 Capricorni	5.8	3.81	5.4	21 49.8	11 0 20.3	- 9 0.4	-0.5580	0.5240	0.1757	+ 3	-82
η Capricorni	4.8	3.81	7.5	20 11.9	9 20.0	- 0 17.6	-0.7045	0.5178	0.1908	- 2	-90
χ Capricorni	5.3	3.86	7.7	21 32.5	11 23.3	+ 1 42.0	+1.1711	0.5164	0.1940	+68	+26
27 Capricorni	6.1	+3.85	+ 7.8	-20 54.2	11 53.3	+ 2 11.1	+0.5659	0.5161	+0.1947	+64	-14
ϕ Capricorni	5.3	3.86	8.5	21 0.7	14 57.3	+ 5 9.4	+1.2885	0.5140	0.1994	+69	+39
128 B. Capricorni	6.5	3.85	10.2	19 31.5	22 18.2	-11 42.9	+1.1547	0.5092	0.2097	+70	+23
γ Capricorni	3.8	3.81	11.6	17 3.1	12 3 33.7	- 6 36.6	-0.4556	0.5060	0.2166	+14	-72
δ Capricorni	3.0	3.81	12.1	16 31.2	7 12.4	- 3 4.3	-0.2477	0.5039	0.2210	+25	-58
152 B. Capricorni	6.5	+3.82	+12.5	-17 14.9	8 53.3	- 1 26.3	+0.9316	0.5029	+0.2230	+73	+ 6
ϵ Aquarii	4.4	3.77	14.4	14 17.3	17 34.6	+ 7 0.1	-0.3661	0.4982	0.2323	+21	-66
39 Aquarii	6.2	3.78	14.9	14 37.1	20 49.0	+10 9.0	+0.7577	0.4966	0.2355	+75	- 5
42 Aquarii	5.5	3.75	15.5	13 15.7	23 12.5	-11 31.5	-0.1811	0.4954	0.2377	+31	-54
45 Aquarii	6.1	3.77	15.6	13 44.2	18 0 24.4	-10 21.6	+0.6315	0.4948	0.2387	+75	-12
σ Aquarii	4.9	+3.71	+16.8	-11 7.1	6 49.7	- 4 7.0	-0.7219	0.4919	+0.2440	+ 5	-90
58 Aquarii	6.4	3.72	16.9	11 20.8	7 24.0	- 3 33.6	-0.3293	0.4917	0.2445	+25	-63
λ Aquarii	3.8	3.66	18.8	8 2.3	19 6.8	+ 7 50.1	-1.0912	0.4874	0.2525	-17	-90
78 Aquarii	6.3	3.65	18.9	7 39.7	20 13.2	+ 8 54.7	-1.2292	0.4870	0.2531	-27	-90
81 Aquarii	6.4	3.65	19.4	7 31.4	14 0 4.9	-11 19.7	-0.4023	0.4859	0.2552	+23	-68
82 Aquarii	6.4	+3.65	+19.5	- 7 2.2	0 44.1	-10 41.6	-0.7766	0.4857	+0.2555	+ 3	-90
h Aquarii	5.4	3.68	19.7	8 9.5	2 12.6	- 9 15.4	+0.8477	0.4853	0.2562	+82	0
ϕ Aquarii	4.4	3.64	20.2	6 30.8	7 26.5	- 4 9.9	+0.3657	0.4840	0.2585	+64	-26
96 Aquarii	5.7	3.63	20.7	5 35.6	10 20.5	- 1 20.4	+0.0955	0.4834	0.2596	+49	-40
316 B. Aquarii	6.5	3.62	20.7	4 23.2	10 50.2	- 0 51.5	-1.1175	0.4833	0.2598	-17	-90
317 B. Aquarii	6.3	+3.63	+20.7	- 6 22.6	11 5.4	- 0 36.8	+1.1610	0.4832	+0.2598	+84	+20
337 B. Aquarii	6.4	3.62	21.2	5 0.0	16 9.7	+ 4 19.6	+0.9522	0.4824	0.2614	+85	+ 6
342 B. Aquarii	6.5	3.61	21.3	4 33.4	17 18.5	+ 5 26.5	+0.7587	0.4822	0.2616	+80	- 6
60 B. Piscium	6.0	3.54	22.6	0 22.1	15 6 44.3	- 5 28.8	-0.3678	0.4812	0.2636	+26	-65
98 B. Piscium	6.3	3.51	23.5	+ 1 12.7	20 0.5	+ 7 26.6	+1.3735	0.4818	0.2630	+90	+40
60 Piscium	6.2	+3.45	+24.0	+ 6 16.4	16 12 56.3	- 0 4.4	+0.1736	0.4848	+0.2584	+54	-35
62 Piscium	6.1	3.45	23.9	6 49.9	13 26.4	+ 0 25.0	-0.3167	0.4850	0.2582	+28	-61
δ Piscium	4.6	3.45	23.8	7 7.1	13 39.8	+ 0 38.0	-0.5771	0.4850	0.2581	+15	-77
ϵ Piscium	4.4	3.43	24.1	7 25.7	21 43.2	+ 8 28.5	+1.1435	0.4874	0.2543	+90	+20
π Piscium	5.6	3.38	23.7	11 42.2	17 16 34.0	+ 2 48.3	+1.0914	0.4952	0.2413	+90	+19
20 H ¹ . Arietis	6.4	+3.37	+22.3	+16 49.4	18 9 42.3	- 4 32.8	-0.5534	0.5046	+0.2244	+16	-68

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS. SEPTEMBER.

Limit- ing Par- allels.	
N.	S.
•	•
-18	-71
+90	+44
+41	-38
+90	+3
+50	-28
+90	+18
+20	-53
-10	-65
+74	-5
+90	+5
+38	-34
+62	-14
+73	-6
+59	-16
+62	-14
+90	+21
+90	+16
+90	+26
+90	+21
+12	-59
+25	-44
-2	-63
+90	+41
-49	-62
+38	-27
+74	+3
+57	-9
+80	+9
-37	-61
+17	-45
+39	-22
+90	+40
+11	-50
+90	+27
+90	+53
+32	-26
+90	+56
-6	-60
-9	-60
-17	-60
+69	+2
+5	-59
+47	-16
-3	-61
+87	+9
+8	-58
+83	+6
+3	-62
-11	-62
-40	-62
+18	-49
+61	-11
-39	-63
+30	-40
+44	-27
-12	-64

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>		<i>d h m</i>	<i>h m</i>				<i>°</i>	<i>'</i>
35 B. Cancrī	6.4	+2.19	+ 1.0	+23 24.0	24 22 38.4	+ 2 45.2	+1.2336	0.5743	-0.1570	+90	+46
λ Cancrī	5.9	2.18	+ 0.2	24 17.8	25 1 23.2	+ 5 23.6	-0.1184	0.5734	0.1643	+38	-35
28 Cancrī	6.1	2.14	- 0.3	24 26.0	4 39.3	+ 8 32.2	-0.8077	0.5723	0.1729	- 1	-66
ν^1 Cancrī	5.7	2.13	0.5	24 22.5	5 50.1	+ 9 40.3	-0.9529	0.5719	0.1760	-10	-66
ν^2 Cancrī	6.4	2.12	0.6	24 22.9	6 26.5	+10 15.3	-1.0660	0.5716	0.1775	-19	-66
γ Cancrī	4.7	+2.02	- 0.4	+21 46.9	10 40.3	- 9 40.6	+0.7846	0.5700	-0.1881	+90	+ 9
8 Leonis	5.9	1.71	2.3	16 49.6	26 9 5.7	+11 54.5	+0.9429	0.5606	0.2373	+90	+13
34 Leonis	6.4	1.54	3.6	13 47.0	23 56.4	+ 2 12.9	+0.2415	0.5546	0.2624	+58	-28
37 Leonis	5.5	+1.53	- 4.0	14 9.7	27 2 7.6	+ 4 19.4	-0.7088	0.5538	0.2656	+ 8	-76
VENUS	-3.4	.....	.....	+11 45.0	3 26.0	+ 5 35.1	+1.3270	0.5074	-0.2518	+90	+39
NEW MOON.											

OCTOBER.

231 G. Virginis	6.4	+1.20	-13.0	-18 11.1	1 12 7.1	+10 36.1	+1.0716	0.5605	-0.2427	+72	+16
236 G. Virginis	5.7	1.21	13.1	18 19.0	12 47.1	+11 14.7	+1.0416	0.5608	0.2414	+72	+14
9 G. Libræ	6.5	1.27	13.7	20 3.7	19 34.4	- 6 13.1	+1.1888	0.5637	0.2282	+70	+26
17 G. Libræ	6.4	1.32	14.1	20 48.7	2 0 17.2	- 1 40.9	+0.8883	0.5657	0.2183	+69	+ 4
18 G. Libræ	6.1	1.32	14.1	20 57.9	0 42.9	- 1 16.1	+0.9478	0.5659	0.2174	+69	+ 8
43 B. Libræ	5.7	+1.43	-15.5	-21 1.7	4 54.0	+ 2 45.6	+0.1231	0.5678	-0.2081	+39	-38
47 G. Libræ	6.1	1.42	14.4	21 41.9	8 37.4	+ 6 20.5	+0.0369	0.5692	0.1994	+34	-42
64 G. Libræ	5.8	1.47	14.5	22 4.9	12 40.7	+10 14.6	-0.3655	0.5707	0.1896	+13	-67
153 B. Libræ	6.3	1.57	15.0	24 11.9	19 26.9	- 7 14.7	+0.5472	0.5731	0.1724	+59	-15
169 B. Libræ	6.0	1.59	14.7	22 51.5	21 20.4	- 5 25.6	-1.1333	0.5737	0.1674	-35	-90
177 B. Libræ	6.2	+1.60	-14.7	-22 52.2	21 58.0	- 4 49.5	-1.2252	0.5739	-0.1658	-44	-90
42 Libræ	5.0	1.61	14.8	23 32.4	22 19.8	- 4 28.5	-0.6062	0.5740	0.1648	- 2	-87
<i>b</i> Scorpii	4.7	1.68	15.3	25 29.5	3 2 35.8	- 0 22.4	+0.6976	0.5753	0.1533	+64	- 6
<i>A</i> Scorpii	4.6	1.70	15.1	25 4.3	3 39.4	+ 0 38.8	+0.1099	0.5755	0.1504	+33	-38
31 B. Scorpii	5.4	1.70	14.9	24 16.7	3 46.9	+ 0 46.0	-0.7164	0.5756	0.1500	- 9	-90
32 B. Scorpii	5.3	+1.70	-14.7	-23 43.4	3 48.1	+ 0 47.1	-1.2848	0.5755	-0.1500	-54	-90
3 Scorpii	5.9	1.70	15.1	24 59.4	4 4.5	+ 1 2.9	-0.0359	0.5756	0.1492	+25	-47
4 Scorpii	5.7	1.71	15.4	26 0.9	4 24.0	+ 1 21.6	+0.9584	0.5757	0.1483	+64	+12
40 B. Scorpii	5.4	1.73	14.9	24 35.1	5 38.9	+ 2 33.6	-0.6805	0.5760	0.1448	- 8	-90
π Scorpii	3.0	1.73	15.3	25 52.1	5 44.3	+ 2 38.8	+0.6146	0.5761	0.1446	+60	-10
48 B. Scorpii	4.9	+1.76	-15.1	-25 37.7	7 32.3	+ 4 22.6	+0.1138	0.5765	-0.1395	+32	-38
50 B. Scorpii	6.4	1.76	14.8	24 29.5	7 46.6	+ 4 36.4	-1.0796	0.5765	0.1388	-34	-90
65 B. Scorpii	5.5	1.80	15.1	26 5.9	9 25.7	+ 6 11.5	+0.3356	0.5769	0.1342	+43	-26
85 B. Scorpii	6.0	1.84	14.8	25 15.7	12 8.0	+ 8 47.6	-0.8739	0.5774	0.1264	-21	-90
σ Scorpii	3.1	1.88	14.7	25 23.3	14 37.9	+11 11.6	-1.0511	0.5778	0.1192	-34	-90
α Scorpii	1.2	+1.94	-14.8	-26 14.6	17 52.6	- 9 41.4	-0.5467	0.5782	-0.1097	- 4	-82
116 B. Scorpii	6.2	1.95	14.7	26 21.2	18 39.5	- 8 56.3	-0.5194	0.5783	0.1074	- 3	-80
τ Scorpii	2.9	2.00	15.1	28 2.4	20 24.7	- 7 15.2	+1.0332	0.5784	0.1022	+62	+19
134 B. Scorpii	6.4	2.05	14.6	27 17.9	23 45.1	- 4 2.7	-0.0559	0.5786	0.0922	+19	-48
135 B. Scorpii	6.0	2.07	14.9	28 21.1	4 0 1.0	- 3 47.5	+1.0085	0.5786	0.0914	+62	+17
95 G. Ophiuchi	6.1	+2.26	-13.8	-27 39.5	10 52.3	+ 6 38.2	-0.5223	0.5781	-0.0585	- 8	-81
43 Ophiuchi	5.4	2.35	13.4	28 3.8	15 12.1	+10 47.8	-0.3276	0.5774	0.0453	+ 1	-65
163 G. Ophiuchi	6.3	2.49	12.4	27 50.8	23 8.6	- 5 34.4	-0.8213	0.5755	0.0212	-27	-90
<i>X</i> Sagittarii (<i>var.</i>)	4.4	2.52	12.1	27 48.1	5 0 51.1	- 3 55.7	-0.9007	0.5750	0.0160	-32	-90
10 G. Sagittarii	5.7	2.60	11.7	28 3.3	4 30.7	- 0 24.7	-0.6749	0.5737	0.0050	-20	-90
210 B. Scorpii	5.8	+2.63	-11.8	-28 45.2	5 17.3	+ 0 20.1	+0.0568	0.5734	-0.0027	+17	-41
<i>W</i> Sagittarii (<i>var.</i>)	4.3	2.69	11.8	29 35.3	7 50.4	+ 2 47.3	+0.9399	0.5724	+0.0049	+60	+12
38 B. Sagittarii	4.7	2.69	11.2	28 28.2	9 5.9	+ 3 59.9	-0.2301	0.5719	0.0086	+ 3	-59
C. D. -28° 14268	6.4	2.72	11.1	28 55.4	10 39.9	+ 5 30.3	+0.2659	0.5712	0.0133	+29	-29
48 G. Sagittarii	6.3	2.76	10.7	28 19.2	12 52.6	+ 7 37.9	-0.3361	0.5702	0.0197	- 2	-66
62 B. Sagittarii	6.0	+2.76	-10.6	-28 41.1	12 52.8	+ 7 38.1	+0.0499	0.5701	+0.0197	+18	-42

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
OCTOBER.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i> <i>'</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>°</i>
21 Tauri	5.8	+3.98	+20.0	+24 17.4	17 14 20.7	+ 0 24.7	+0.1701	0.5410	+0.1489	+54	-20
22 Tauri	6.5	3.98	20.0	24 15.8	14 24.5	+ 0 28.5	+0.2084	0.5410	0.1488	+57	-18
23 Tauri	4.3	3.97	20.1	23 41.0	14 32.7	+ 0 36.3	+0.8561	0.5411	0.1485	+90	+17
7 Tauri	3.0	3.97	20.0	23 50.5	15 4.1	+ 1 6.6	+0.7614	0.5415	0.1474	+90	+11
27 Tauri	3.7	3.97	19.9	23 47.6	15 49.8	+ 1 50.7	+0.9256	0.5420	0.1457	+90	+21
28 Tauri	5.2	+3.97	+19.9	+23 52.6	15 50.4	+ 1 51.3	+0.8366	0.5420	+0.1457	+90	+16
14 H. Tauri	5.3	4.00	19.5	25 19.4	16 19.7	+ 2 19.7	-0.6587	0.5424	0.1447	+ 8	-63
<i>p</i> Tauri	5.6	4.01	17.9	26 15.6	18 1 29.2	+11 10.1	-0.4373	0.5489	0.1242	+21	-49
ϕ Tauri	5.0	4.02	17.0	27 8.9	5 39.3	- 8 48.6	-0.8972	0.5516	0.1143	- 8	-63
χ Tauri	5.3	3.98	17.2	25 25.8	6 39.2	- 7 50.7	+1.0677	0.5523	0.1119	+90	+35
17 B. Aurigæ	6.0	+4.00	+14.3	+27 45.4	19 35.3	+ 4 37.4	-0.1982	0.5602	+0.0790	+33	-32
38 B. Aurigæ	6.5	3.97	13.3	27 34.7	19 0 35.2	+ 9 26.3	+0.3536	0.5628	0.0656	+67	- 1
47 B. Aurigæ	6.0	3.97	12.9	27 55.5	2 43.3	+11 29.6	+0.1172	0.5639	0.0598	+51	-13
354 B. Tauri	6.4	3.94	11.9	27 52.4	7 24.3	- 7 59.8	+0.4218	0.5660	0.0468	+72	+ 4
22 Aurigæ	6.4	3.97	11.4	28 51.5	8 22.7	- 7 3.5	-0.5843	0.5664	0.0440	+11	-51
β Tauri	1.8	+3.95	+11.1	+28 32.3	9 35.2	- 5 53.7	-0.1918	0.5670	+0.0406	+33	-28
107 B. Aurigæ	6.5	3.90	10.6	27 36.6	13 34.6	- 2 3.3	+0.9364	0.5684	0.0293	+90	+34
116 B. Aurigæ	5.9	3.94	9.9	29 10.1	14 56.3	- 0 44.8	-0.6857	0.5689	0.0254	+ 5	-58
406 B. Tauri	5.6	3.86	9.2	27 56.7	19 44.0	+ 3 52.0	+0.7025	0.5703	0.0115	+90	+21
136 Tauri	4.6	3.84	9.1	27 35.7	20 42.2	+ 4 48.0	+1.0836	0.5706	0.0086	+90	+45
154 B. Aurigæ	6.4	+3.88	+ 8.4	+28 55.9	21 59.9	+ 6 2.7	-0.3254	0.5709	+0.0048	+26	-32
415 B. Tauri	6.1	3.82	8.4	27 34.3	23 50.0	+ 7 48.6	+1.1202	0.5713	-0.0005	+90	+48
183 B. Aurigæ	6.3	3.86	7.3	29 31.3	20 1 58.7	+ 9 52.3	-0.9537	0.5718	0.0068	-13	-60
κ Aurigæ	4.4	3.82	6.3	29 32.0	5 38.2	-10 36.6	-1.0080	0.5724	0.0176	-18	-60
211 B. Aurigæ	6.3	3.81	5.9	29 35.0	7 59.3	- 8 20.9	-1.1094	0.5726	0.0246	-27	-60
49 Aurigæ	5.1	+3.71	+ 5.1	+28 5.5	13 40.8	- 2 52.6	+0.2747	0.5730	-0.0414	+61	- 4
53 Aurigæ	5.6	3.72	4.5	29 3.7	14 57.1	- 1 39.1	-0.7994	0.5731	0.0452	- 2	-61
54 Aurigæ	5.8	3.69	4.7	28 20.5	15 26.1	- 1 11.3	-0.0654	0.5731	0.0466	+41	-21
28 Geminorum	5.5	3.69	3.9	29 3.7	17 31.7	+ 0 49.5	-0.9245	0.5731	0.0528	-11	-61
47 Geminorum	5.6	3.50	2.2	27 0.1	21 4 20.4	+11 13.2	+0.4925	0.5721	0.0844	+78	+ 4
53 Geminorum	5.9	+3.52	+ 1.4	+28 3.0	6 10.6	-11 0.9	-0.7629	0.5718	-0.0896	0	-62
134 B. Geminorum	6.5	3.49	1.6	26 50.8	6 38.5	-10 34.0	+0.4503	0.5718	0.0910	+74	+ 1
59 Geminorum	5.7	3.47	0.8	27 48.4	9 40.7	- 7 38.8	-0.8396	0.5712	0.0996	- 4	-62
<i>z</i> Geminorum	3.9	3.45	+ 0.5	27 58.3	10 9.4	- 7 11.2	-1.0592	0.5711	0.1010	-21	-62
<i>v</i> Geminorum	4.3	3.38	- 0.1	27 5.4	14 19.5	- 3 10.6	-0.5848	0.5701	0.1127	+12	-56
<i>c</i> Geminorum	5.5	+3.31	- 0.4	+25 59.5	17 41.6	+ 0 3.7	+0.1610	0.5692	-0.1220	+54	-17
ω Cancrî	5.9	3.20	1.7	25 37.9	22 0 37.1	+ 6 43.6	-0.3746	0.5670	0.1406	+24	-47
4 Cancrî	6.2	3.19	1.7	25 19.8	0 57.2	+ 7 3.0	-0.1097	0.5668	0.1415	+38	-32
ψ Cancrî	5.9	3.15	2.9	25 46.3	4 33.8	+10 31.4	-1.0929	0.5656	0.1509	-22	-64
35 B. Cancrî	6.4	3.07	2.1	23 24.0	5 56.6	+11 51.1	+1.1432	0.5650	0.1544	+90	+37
λ Cancrî	5.9	+3.06	- 3.0	+24 17.8	8 46.8	- 9 25.1	-0.2295	0.5640	-0.1615	+32	-40
28 Cancrî	6.1	3.01	3.7	24 26.0	12 9.6	- 6 9.8	-0.9295	0.5626	0.1698	- 9	-66
<i>v</i> ¹ Cancrî	5.7	2.99	3.9	24 22.4	13 22.8	- 4 59.3	-1.0770	0.5622	0.1728	-20	-66
<i>v</i> ² Cancrî	6.4	2.98	4.0	24 22.8	14 0.4	- 4 23.1	-1.1918	0.5619	0.1743	-31	-66
γ Cancrî	4.7	2.86	3.9	21 46.9	18 23.1	- 0 10.1	+0.6892	0.5600	0.1846	+90	+ 4
8 Leonis	5.9	+2.45	- 6.3	+16 49.6	23 17 37.3	- 1 46.1	+0.8572	0.5501	-0.2323	+90	+ 9
34 Leonis	6.4	2.21	7.6	13 47.0	24 9 0.5	-10 55.0	+0.1522	0.5445	0.2569	+53	-32
37 Leonis	5.5	2.18	8.1	14 9.6	11 16.4	- 8 43.7	-0.8120	0.5438	0.2600	+ 2	-76
<i>c</i> Leonis	5.1	1.85	8.4	6 34.0	25 7 20.1	+10 38.9	+1.3245	0.5392	0.2819	+90	+37
χ Leonis	4.7	1.83	9.0	7 48.3	9 17.9	-11 27.3	-0.4629	0.5389	0.2834	+21	-69
σ Leonis	4.1	+1.75	- 9.5	+ 6 30.2	16 41.5	- 4 18.6	-1.2826	0.5384	-0.2884	-30	-83
80 Leonis	6.4	1.71	9.2	4 20.2	18 51.3	- 2 13.1	+0.2432	0.5383	0.2896	+58	-32
83 Leonis	6.3	1.67	8.9	3 29.1	19 18.5	- 1 46.8	+0.9568	0.5383	0.2898	+90	+ 6
τ Leonis	5.2	1.70	9.1	3 20.0	19 49.2	- 1 17.1	+0.9592	0.5383	0.2901	+90	+ 7
89 Leonis	5.7	1.67	9.5	3 32.5	22 47.0	+ 1 34.7	-0.1088	0.5383	0.2914	+39	-50
9 B. Virginis	6.2	+1.57	- 9.4	+ 0 9.7	26 5 31.3	+ 8 5.5	+1.2650	0.5387	-0.2934	+90	+28

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
OCTOBER.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.		
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H		Y	x'	y'	N.	S.
		Δα	Δδ									
		s	"	° '	d h m	h m					°	°
317 B. Aquarii	6.3	+3.45	+19.3	6 22.7	8 0 17.2	7 50.0	+1.3117	0.4816	+0.2573	+84	+33	
337 B. Aquarii	6.4	3.49	20.1	5 0.1	5 21.0	2 54.1	+1.0932	0.4809	0.2589	+85	+15	
342 B. Aquarii	6.5	3.49	20.3	4 33.4	6 30.5	1 46.4	+0.9008	0.4807	0.2592	+85	+3	
60 B. Piscium	6.0	3.53	22.7	0 22.1	19 56.0	+11 18.0	-0.2461	0.4804	0.2613	+32	-58	
60 Piscium	6.2	3.70	25.9	+ 6 16.4	10 2 1.1	7 24.6	+0.2300	0.4864	0.2569	+57	-32	
62 Piscium	6.1	+3.70	+26.0	+ 6 49.9	2 31.0	6 55.4	-0.2598	0.4865	+0.2567	+31	-57	
δ Piscium	4.6	3.70	26.0	7 7.1	2 44.3	6 42.5	-0.5196	0.4866	0.2566	+18	-73	
ε Piscium	4.4	3.75	26.3	7 25.8	10 43.9	+ 1 4.2	+1.1756	0.4898	0.2531	+90	+23	
π Piscium	5.6	3.89	27.0	11 42.3	11 5 22.6	4 48.1	+1 0773	0.4992	0.2408	+90	+18	
20 H ¹ . Arietis	6.4	4.06	26.8	16 49.4	22 16.4	+11 36.3	-0.6020	0.5101	0.2242	+13	-70	
26 Arietis	6.2	+4.17	+26.4	+19 28.6	12 9 0.2	1 59.2	-1.1617	0.5179	+0.2108	-24	-71	
27 Arietis	6.4	4.14	26.2	17 19.6	9 9.8	1 49.9	+1.2176	0.5180	0.2105	+90	+35	
μ Arietis	5.7	4.21	25.9	19 38.9	14 48.1	+ 3 37.9	-0.1495	0.5223	0.2025	+36	-42	
47 Arietis	5.8	4.28	25.1	20 19.6	22 24.1	+10 59.5	+0.6060	0.5283	0.1905	+85	- 2	
ε Arietis (mean)	4.6	4.29	25.1	21 0.0	22 56.7	+11 31.1	-0.0214	0.5286	0.1896	+43	-34	
66 Arietis	6.1	+4.40	+23.2	+22 30.7	18 12 37.7	+ 0 45.2	+0.7679	0.5395	+0.1647	+90	+10	
7 Tauri	5.9	4.46	22.8	24 10.8	15 21.0	+ 3 22.9	-0.5947	0.5418	0.1593	+12	-61	
11 Tauri	6.1	4.50	22.3	25 3.3	18 12.6	+ 6 8.8	-1.0923	0.5441	0.1534	-22	-65	
16 Tauri	5.4	4.48	22.0	24 1.4	20 2.5	+ 7 54.9	+0.2997	0.5454	0.1495	+62	-13	
17 Tauri	3.8	4.48	22.0	23 50.8	20 4.6	+ 7 56.9	+0.4948	0.5454	0.1495	+77	- 3	
18 Tauri	5.6	+4.50	+22.0	+24 34.4	20 11.7	+ 8 3.8	-0.2714	0.5455	+0.1492	+29	-42	
q Tauri	4.3	4.49	22.0	24 12.1	20 13.2	+ 8 5.2	+0.1337	0.5455	0.1491	+52	-21	
20 Tauri	4.1	4.49	22.0	24 6.2	20 30.0	+ 8 21.5	+0.2816	0.5458	0.1485	+61	-14	
21 Tauri	5.8	4.49	22.0	24 17.4	20 32.0	+ 8 23.4	+0.0848	0.5458	0.1485	+49	-24	
22 Tauri	6.5	4.49	22.0	24 15.8	20 35.8	+ 8 27.1	+0.1227	0.5459	0.1483	+51	-22	
23 Tauri	4.3	+4.48	+21.9	+23 41.0	20 43.9	+ 8 34.9	+0.7673	0.5460	+0.1480	+90	+12	
η Tauri	3.0	4.48	21.8	23 50.6	21 14.9	+ 9 4.8	+0.6721	0.5463	0.1469	+90	+ 6	
27 Tauri	3.7	4.49	21.7	23 47.6	22 0.0	+ 9 48.3	+0.8343	0.5469	0.1453	+90	+16	
28 Tauri	5.2	4.49	21.7	23 52.7	22 0.6	+ 9 48.9	+0.7457	0.5469	0.1453	+90	+11	
14 H. Tauri	5.3	4.53	21.5	25 19.4	22 29.5	+10 16.8	-0.7434	0.5472	0.1442	+ 2	-65	
p Tauri	5.6	+4.60	+19.8	+26 15.6	14 7 31.9	- 4 59.7	-0.5374	0.5539	+0.1236	+14	-55	
φ Tauri	5.0	4.64	18.8	27 8.9	11 38.8	- 1 1.6	-1.0016	0.5568	0.1137	-16	-63	
χ Tauri	5.3	4.60	18.8	25 25.8	12 38.0	- 0 4.5	+0.9529	0.5575	0.1113	+90	+27	
17 B. Aurigæ	6.0	4.71	15.7	27 45.4	15 1 24.5	-11 46.0	-0.3265	0.5652	0.0781	+26	-39	
38 B. Aurigæ	6.5	4.70	14.5	27 34.8	6 20.9	- 7 0.7	+0.2163	0.5677	0.0647	+58	- 9	
47 B. Aurigæ	6.0	+4.72	+14.0	+27 55.5	8 27.6	- 4 58.7	-0.0223	0.5687	+0.0588	+43	-20	
354 B. Tauri	6.4	4.71	12.8	27 52.4	13 5.7	- 0 31.0	+0.2750	0.5707	0.0457	+61	- 4	
22 Aurigæ	6.4	4.75	12.4	28 51.5	14 3.5	+ 0 24.6	-0.7293	0.5711	0.0430	+ 2	-61	
β Tauri	1.8	4.74	12.0	28 32.3	15 15.3	+ 1 33.6	-0.3396	0.5715	0.0395	+25	-36	
107 B. Aurigæ	6.5	4.69	11.2	27 36.6	19 12.5	+ 5 21.9	+0.7800	0.5728	0.0281	+90	+24	
116 B. Aurigæ	5.9	+4.75	+10.6	+29 10.1	20 33.3	+ 6 39.5	-0.8394	0.5732	+0.0242	- 5	-61	
406 B. Tauri	5.6	4.69	9.5	27 56.7	18 1 18.6	+11 13.9	+0.5393	0.5744	0.0102	+82	+13	
136 Tauri	4.6	4.68	9.3	27 35.7	2 16.4	-11 50.4	+0.9183	0.5745	0.0073	+90	+34	
154 B. Aurigæ	6.4	4.72	8.7	28 55.9	3 33.5	-10 36.3	-0.4895	0.5749	+0.0035	+16	-42	
415 B. Tauri	6.1	4.66	8.4	27 34.3	5 22.8	- 8 51.2	+0.9513	0.5751	-0.0019	+90	+37	
183 B. Aurigæ	6.3	+4.73	+ 7.4	+29 31.3	7 30.7	- 6 48.3	-1.1217	0.5754	-0.0082	-29	-60	
κ Aurigæ	4.4	4.71	6.2	29 32.0	11 8.8	- 3 18.6	-1.1808	0.5757	0.0190	-36	-60	
49 Aurigæ	5.1	4.61	4.4	28 5.5	19 9.3	+ 4 23.3	+0.0911	0.5757	0.0428	+50	-13	
53 Aurigæ	5.6	4.64	3.8	29 3.7	20 25.3	+ 5 36.5	-0.9843	0.5756	0.0466	-16	-61	
54 Aurigæ	5.8	4.60	3.9	28 20.5	20 54.3	+ 6 4.3	-0.2509	0.5756	0.0480	+30	-31	
28 Geminorum	5.5	+4.62	+ 3.1	+29 3.6	22 59.5	+ 8 4.6	-1.1126	0.5754	-0.0541	-27	-61	
47 Geminorum	5.6	4.44	+ 0.5	27 0.0	17 9 48.0	- 5 31.9	+0.2938	0.5733	0.0855	+63	- 6	
53 Geminorum	5.9	4.47	- 0.2	28 3.0	11 38.4	- 3 45.7	-0.9661	0.5728	0.0908	-14	-62	
134 B. Geminorum	6.5	4.42	0.1	26 50.8	12 6.3	- 3 18.8	+0.2493	0.5727	0.0921	+59	-10	
59 Geminorum	5.7	4.42	1.1	27 48.4	15 9.0	- 0 23.1	-1.0468	0.5718	0.1006	-20	-62	
ι Geminorum	3.9	+4.42	- 1.3	+27 58.3	15 37.8	+ 0 4.6	-1.2675	0.5716	-0.1020	-48	-62	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Par- allels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
		s	"	° '	d h m	h m				°	°
υ Geminorum	4.3	+4.34	- 2.3	+27 5.4	17 19 48.9	+ 4 6.2	-0.7963	0.5702	-0.1135	- 2	-63
c Geminorum	5.5	4.26	2.8	25 59.5	23 12.2	+ 7 21.7	-0.0512	0.5689	0.1227	+41	-28
ω Cancri	5.9	4.17	4.6	25 37.8	18 6 10.7	- 9 55.5	-0.5953	0.5657	0.1410	+11	-59
5 B. Cancri	6.4	4.11	4.0	23 49.3	6 14.4	- 9 52.0	+1.2754	0.5657	0.1411	+90	+53
4 Cancri	6.2	4.15	4.5	25 19.7	6 31.0	- 9 36.0	-0.3294	0.5656	0.1418	+26	-44
35 B. Cancri	6.4	+4.02	- 5.2	+23 23.9	11 33.3	- 4 44.9	+0.9268	0.5631	-0.1544	+90	+21
λ Cancri	5.9	4.02	6.2	24 17.7	14 25.5	- 1 59.0	-0.4560	0.5616	0.1614	+19	-53
28 Cancri	6.1	3.98	7.2	24 25.9	17 50.8	+ 1 18.7	-1.1632	0.5600	0.1695	-28	-66
υ ¹ Cancri	5.7	3.95	7.5	24 22.4	19 5.0	+ 2 30.2	-1.3127	0.5593	0.1724	-50	-66
γ Cancri	4.7	3.80	7.8	21 46.8	19 0 9.7	+ 7 23.9	+0.4631	0.5565	0.1838	+73	- 8
8 Leonis	5.9	+3.35	-11.0	+16 49.5	23 51.8	+ 6 15.9	+0.6279	0.5441	-0.2296	+86	- 5
34 Leonis	6.4	3.07	12.7	13 46.9	20 15 39.5	- 2 28.5	-0.0833	0.5369	0.2529	+40	-44
37 Leonis	5.5	3.04	13.2	14 9.5	17 59.3	- 0 13.4	-1.0599	0.5360	0.2558	-14	-76
c Leonis	5.1	2.64	13.5	6 33.9	21 14 41.1	- 4 12.4	+1.1218	0.5303	0.2762	+90	+19
χ Leonis	4.7	2.62	14.2	7 48.2	16 42.8	- 2 14.7	-0.6914	0.5299	0.2776	+ 9	-82
80 Leonis	6.4	+2.47	-14.2	+ 4 20.1	22 2 35.7	+ 7 19.0	+0.0369	0.5289	-0.2833	+46	-42
83 Leonis	6.3	2.42	13.8	3 29.0	3 3.8	+ 7 46.2	+0.7627	0.5289	0.2835	+90	- 5
τ Leonis	5.2	2.45	14.0	3 19.9	3 35.6	+ 8 17.0	+0.7658	0.5289	0.2837	+90	- 5
89 Leonis	5.7	2.41	14.4	3 32.4	6 39.5	+11 14.9	-0.3154	0.5289	0.2849	+28	-61
9 B. Virginis	6.2	2.30	14.0	0 9.7	13 37.8	- 6 0.3	+1.0910	0.5293	0.2868	+90	+15
β Virginis	3.8	+2.37	-15.0	+ 2 15.1	14 22.8	- 5 16.7	-1.2258	0.5293	-0.2869	-25	-88
27 B. Virginis	6.5	2.27	14.6	+ 1 0.6	18 23.1	- 1 24.2	-1.1283	0.5298	0.2874	-18	-89
31 B. Virginis	6.4	2.24	14.1	- 1 17.2	19 19.1	- 0 30.0	+0.9105	0.5300	0.2874	+89	+ 4
162 B. Virginis	6.2	2.09	14.2	4 8.3	23 7 58.2	+11 44.4	+0.1406	0.5329	0.2858	+51	-37
200 B. Virginis	6.3	2.07	14.2	4 34.6	9 44.4	-10 32.9	+0.0748	0.5334	0.2853	+48	-40
f Virginis	6.0	+2.05	-14.2	- 5 21.4	12 8.5	- 8 13.5	+0.1722	0.5342	-0.2844	+53	-35
319 B. Virginis	6.3	2.00	14.5	5 49.8	17 8.7	- 3 23.3	-0.7713	0.5361	0.2821	+ 4	-90
49 Virginis	5.2	1.91	13.9	10 16.8	24 2 29.0	+ 5 38.2	+1.0754	0.5403	0.2758	+80	+15
g Virginis	5.6	1.92	14.4	8 31.4	2 47.3	+ 5 56.0	-0.7666	0.5404	0.2756	+ 3	-90
50 Virginis	6.2	1.91	14.0	9 52.2	3 20.1	+ 6 27.6	+0.4307	0.5407	0.2752	+66	-22
α Virginis	1.2	+1.86	-14.2	-10 42.7	10 19.2	-10 47.5	-0.6279	0.5444	-0.2688	+ 9	-85
ι Virginis	5.7	1.84	13.9	12 15.5	11 0.1	-10 8.1	+0.7375	0.5448	0.2680	+78	- 6
550 B. Virginis	6.0	1.83	14.0	12 46.3	14 33.2	- 6 42.3	+0.3055	0.5468	0.2642	+57	-28
621 B. Virginis	6.4	1.76	14.1	14 33.5	25 3 37.5	+ 5 54.4	-1.2527	0.5550	0.2467	-35	-90
214 G. Virginis	6.5	1.76	13.8	15 55.4	3 57.0	+ 6 13.2	+0.0343	0.5552	0.2462	+40	-42
40 H. Virginis	5.1	+1.76	-13.9	-15 53.7	6 22.2	+ 8 33.2	-0.5853	0.5569	-0.2424	+ 8	-82
43 H. Virginis	5.5	1.74	13.7	17 47.9	8 18.8	+10 25.7	+0.8534	0.5583	-0.2392	+72	+ 2
NEW MOON.											
58 G. Sagittarii	6.1	+2.24	- 8.5	-28 28.4	29 9 30.1	+ 7 47.1	+0.1842	0.5845	+0.0283	+26	-34
φ Sagittarii	3.3	+2.32	- 7.1	-27 5.0	18 52.2	- 7 13.1	-0.8675	0.5790	+0.0565	-27	-90
τ Sagittarii	3.5	2.41	6.2	27 48.0	30 3 26.6	+ 1 1.5	+0.4733	0.5727	0.0810	+47	-17
201 B. Sagittarii	5.9	2.41	5.3	26 3.3	6 2.5	+ 3 31.4	-1.1414	0.5707	0.0881	-44	-90
248 B. Sagittarii	5.7	2.50	4.5	27 9.9	12 55.4	+10 8.8	+0.6974	0.5649	0.1063	+62	- 5
h Sagittarii	4.7	2.50	3.6	25 4.6	15 49.8	-11 3.3	-1.1892	0.5623	0.1137	-46	-90
308 B. Sagittarii	6.3	+2.54	- 2.6	-24 9.5	23 22.5	- 3 47.0	-1.2406	0.5555	+0.1319	-49	-90

DECEMBER.

36 B. Capricorni	6.2	+2.68	+ 0.6	-22 40.8	1 15 2.8	+11 20.6	-0.4894	0.5406	+0.1652	+ 5	-76
17 Capricorni	5.8	+2.74	+ 2.0	-21 49.8	22 45.6	- 5 12.1	-0.0728	0.5332	+0.1795	+28	-48
η Capricorni	4.8	2.78	3.8	20 11.9	2 7 27.9	+ 3 13.3	-0.2059	0.5252	0.1939	+23	-56
27 Capricorni	6.1	2.83	3.9	20 54.3	9 56.7	+ 5 37.4	+1.0438	0.5230	0.1977	+69	+16
30 Capricorni	5.4	2.81	5.4	18 20.9	14 6.3	+ 9 39.2	-0.8890	0.5193	0.2037	-12	-90
γ Capricorni	3.8	2.90	7.4	17 3.2	8 1 14.2	- 3 33.2	+0.0518	0.5101	0.2180	+40	-41
δ Capricorni	3.0	+2.92	+ 7.8	-16 31.2	4 48.7	- 0 5.1	+0.2578	0.5074	+0.2221	+51	-31

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limit- ing Par- allels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declina- tion.	Washington Mean Time.	Hour Angle, H	Y	x'	y'	N.	S.
		Δα	Δδ								
ι	Aquarii	4.4	+2.96	+10.2	-14 17.4	8 15 0.8	+ 9 49.2	+0.1415	0.5001	+0.2324	+47 -37
39	Aquarii	6.2	2.99	10.5	14 37.2	18 12.6	-11 4.5	+1.2516	0.4981	0.2353	+75 +30
42	Aquarii	5.5	2.98	11.3	13 15.8	20 34.4	- 8 46.7	+0.3228	0.4966	0.2373	+57 -27
45	Aquarii	6.1	3.01	11.2	13 44.3	21 45.5	- 7 37.6	+1.1261	0.4959	0.2382	+76 +19
σ	Aquarii	4.9	3.01	12.9	11 7.2	4 4 7.0	- 1 26.8	-0.2173	0.4923	0.2430	+30 -56
58	Aquarii	6.4	+3.02	+12.9	-11 20.9	4 41.0	- 0 53.7	+0.1712	0.4920	+0.2434	+50 -35
213 B.	Aquarii	6.5	3.03	14.6	8 45.8	10 58.8	+ 5 13.6	-1.1276	0.4889	0.2474	-20 -90
λ	Aquarii	3.8	3.07	15.4	8 2.3	16 19.1	+10 25.3	-0.5977	0.4867	0.2504	+12 -82
78	Aquarii	6.3	3.07	15.6	7 39.8	17 25.1	+11 29.5	-0.7362	0.4862	0.2509	+ 5 -90
81	Aquarii	6.4	3.10	16.2	7 31.4	21 15.8	- 8 46.0	+0.0786	0.4848	0.2527	+47 -40
82	Aquarii	6.4	+3.10	+16.4	- 7 2.2	21 54.9	- 8 8.0	-0.2942	0.4846	+0.2530	+28 -60
h	Aquarii	5.4	3.14	16.1	8 9.5	23 23.1	- 6 42.2	+1.3167	0.4841	0.2536	+82 +35
φ	Aquarii	4.4	3.15	17.0	6 30.8	5 4 36.1	- 1 37.4	+0.8288	0.4826	0.2556	+83 - 1
96	Aquarii	5.7	3.18	17.8	5 35.7	7 29.6	+ 1 11.5	+0.5546	0.4819	0.2565	+76 -16
316 B.	Aquarii	6.5	3.17	18.2	4 23.3	7 59.2	+ 1 40.3	-0.6524	0.4818	0.2566	+10 -86
337 B.	Aquarii	6.4	+3.22	+18.3	- 5 0.1	13 18.2	+ 6 50.9	+1.3943	0.4808	+0.2580	+85 +44
342 B.	Aquarii	6.5	3.22	18.6	4 33.5	14 26.9	+ 7 57.8	+1.1989	0.4806	0.2582	+85 +23
60 B.	Piscium	6.0	3.28	21.2	- 0 22.1	6 3 51.8	- 2 58.5	+0.0421	0.4796	0.2598	+46 -42
60	Piscium	6.2	3.54	24.9	+ 6 16.4	7 9 59.6	+ 2 21.6	+0.4741	0.4848	0.2545	+72 -19
62	Piscium	6.1	3.55	25.1	6 49.9	10 29.5	+ 2 50.8	-0.0161	0.4850	0.2543	+43 -44
δ	Piscium	4.6	+3.55	+25.2	+ 7 7.1	10 42.8	+ 3 3.8	-0.2763	0.4851	+0.2542	+30 -58
ε	Piscium	4.4	3.62	25.5	7 25.7	18 43.4	+10 51.4	+1.4031	0.4882	0.2506	+90 +50
π	Piscium	5.6	3.83	26.7	11 42.3	8 13 23.9	+ 5 1.0	+1.2653	0.4979	0.2382	+90 +34
20 H ¹ .	Arietis	6.4	4.07	27.2	16 49.5	9 6 17.7	- 2 34.7	-0.4513	0.5095	0.2218	+20 -62
26	Arietis	6.2	4.23	27.2	19 28.6	17 0.4	+ 7 48.7	-1.0358	0.5179	0.2084	-14 -71
27	Arietis	6.4	+4.20	+26.6	+17 19.6	17 10.0	+ 7 58.0	+1.3379	0.5180	+0.2082	+90 +50
μ	Arietis	5.7	4.30	26.7	19 38.9	22 47.1	-10 35.4	-0.0401	0.5226	0.2003	+42 -36
47	Arietis	5.8	4.42	26.0	20 19.7	10 6 21.2	- 3 15.7	+0.6940	0.5291	0.1884	+90 + 3
ε	Arietis (mean)	4.6	4.42	26.0	21 0.0	6 53.5	- 2 44.4	+0.0672	0.5296	0.1875	+48 -29
66	Arietis	6.1	4.62	24.2	22 30.7	20 29.1	+10 24.4	+0.8187	0.5414	0.1628	+90 +13
7	Tauri	5.9	+4.70	+24.2	+24 10.8	23 11.0	-10 59.3	-0.5450	0.5439	+0.1574	+14 -58
11	Tauri	6.1	4.75	23.8	25 3.3	11 2 1.1	- 8 15.1	-1.0473	0.5463	0.1516	-18 -65
16	Tauri	5.4	4.75	23.3	24 1.4	3 50.0	- 6 29.9	+0.3336	0.5479	0.1477	+65 -11
17	Tauri	3.8	4.74	23.2	23 50.8	3 52.1	- 6 27.9	+0.5277	0.5479	0.1476	+79 - 1
18	Tauri	5.6	4.76	23.3	24 34.4	3 59.1	- 6 21.0	-0.2352	0.5480	0.1474	+31 -40
q	Tauri	4.3	+4.76	+23.3	+24 12.1	4 0.6	- 6 19.6	+0.1679	0.5480	+0.1473	+54 -20
20	Tauri	4.1	4.76	23.2	24 6.2	4 17.3	- 6 3.5	+0.3145	0.5482	0.1467	+63 -12
21	Tauri	5.8	4.76	23.2	24 17.4	4 19.3	- 6 1.6	+0.1186	0.5483	0.1467	+51 -22
22	Tauri	6.5	4.76	23.2	24 15.8	4 23.0	- 5 58.0	+0.1562	0.5483	0.1465	+53 -20
23	Tauri	4.3	4.75	23.1	23 41.1	4 31.0	- 5 50.3	+0.7972	0.5484	0.1463	+90 +14
η	Tauri	3.0	+4.75	+23.0	+23 50.6	5 1.7	- 5 20.7	+0.7012	0.5489	+0.1451	+90 + 8
27	Tauri	3.7	4.76	22.9	23 47.7	5 46.4	- 4 37.6	+0.8607	0.5495	0.1435	+90 +18
28	Tauri	5.2	4.76	22.9	23 52.7	5 46.9	- 4 37.1	+0.7725	0.5495	0.1435	+90 +13
14 H.	Tauri	5.3	4.81	23.0	25 19.4	6 15.6	- 4 9.4	-0.7104	0.5500	0.1424	+ 4 -65
p	Tauri	5.6	4.94	21.2	26 15.6	15 12.0	+ 4 28.1	-0.5275	0.5573	0.1219	+15 -54
φ	Tauri	5.0	+5.01	+20.4	+27 8.9	19 15.9	+ 8 23.2	-0.9989	0.5605	+0.1120	-16 -63
χ	Tauri	5.3	4.97	20.0	25 25.8	20 14.4	+ 9 19.5	+0.9414	0.5612	0.1095	+90 +27
17 B.	Aurigæ	6.0	5.17	17.0	27 45.4	12 8 50.2	- 2 32.5	-0.3609	0.5701	0.0764	+24 -40
38 B.	Aurigæ	6.5	5.20	15.6	27 34.8	13 42.0	+ 2 8.2	+0.1663	0.5729	0.0628	+54 -11
47 B.	Aurigæ	6.0	5.23	15.1	27 55.5	15 46.7	+ 4 8.1	-0.0755	0.5740	0.0569	+40 -23
354 B.	Tauri	6.4	+5.25	+13.7	+27 52.4	20 20.2	+ 8 31.1	+0.2086	0.5763	+0.0437	+57 - 7
22	Aurigæ	6.4	5.30	13.4	28 51.5	21 17.0	+ 9 25.7	-0.7902	0.5767	0.0409	- 2 -61
β	Tauri	1.8	5.30	13.0	28 32.3	22 27.6	+10 33.6	-0.4063	0.5773	0.0375	+21 -40
107 B.	Aurigæ	6.5	5.28	11.8	27 36.6	18 2 20.7	- 9 42.4	+0.6955	0.5788	0.0260	+90 +20
116 B.	Aurigæ	5.9	5.35	11.5	29 10.1	3 40.1	- 8 26.1	-0.9141	0.5793	0.0220	-11 -61
406 B.	Tauri	5.6	+5.32	+10.1	+27 56.7	8 20.4	- 3 56.7	+0.4425	0.5807	+0.0079	+74 + 8

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
DECEMBER.

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.
DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1913.0.		Apparent Declination.	Washington Mean Time.	Hour Angle, <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>								
43 B. Libræ	5.7	+2.52	-17.5	-21 1.7	23 9 55.2	-10 49.1	+0.0346	0.5621	-0.1998	+35	-42
47 G. Libræ	6.1	2.44	15.5	21 41.9	13 43.6	- 7 9.1	-0.0291	0.5646	0.1916	+30	-46
64 G. Libræ	5.8	2.42	15.2	22 4.9	17 51.5	- 3 10.5	-0.4101	0.5675	0.1823	+10	-70
153 B. Libræ	6.3	2.41	14.5	24 11.9	24 0 43.2	+ 3 25.8	+0.5540	0.5719	0.1658	+59	-14
169 B. Libræ	6.0	2.40	14.7	22 51.5	2 37.8	+ 5 16.0	-1.1278	0.5731	0.1611	-35	-90
177 B. Libræ	6.2	+2.39	-14.6	-22 52.2	3 15.7	+ 5 52.4	-1.2161	0.5735	-0.1594	-44	-90
42 Libræ	5.0	2.40	14.5	23 32.4	3 37.7	+ 6 13.6	-0.5902	0.5737	0.1585	+ 2	-85
<i>b</i> Scorpïi	4.7	2.40	13.8	25 29.5	7 55.2	+10 21.2	+0.7478	0.5763	0.1474	+65	- 2
<i>A</i> Scorpïi	4.6	2.40	13.8	25 4.3	8 59.0	+11 22.6	+0.1635	0.5769	0.1445	+35	-35
31 B. Scorpïi	5.4	2.39	14.0	24 16.7	9 6.5	+11 29.8	-0.6660	0.5769	0.1442	- 7	-90
32 B. Scorpïi	5.3	+2.38	-14.1	-23 43.4	9 7.7	+11 30.9	-1.2371	0.5769	-0.1442	-48	-90
3 Scorpïi	5.9	2.39	13.8	24 59.4	9 24.2	+11 46.7	+0.0197	0.5771	0.1434	+28	-43
4 Scorpïi	5.7	2.40	13.6	26 0.8	9 43.7	-11 54.5	+1.0204	0.5773	0.1426	+64	+17
40 B. Scorpïi	5.4	2.39	13.8	24 35.1	10 58.7	-10 42.4	-0.6181	0.5779	0.1392	- 5	-89
π Scorpïi	3.0	2.40	13.6	25 52.1	11 4.2	-10 37.1	+0.6827	0.5780	0.1389	+63	- 6
48 B. Scorpïi	4.9	+2.39	-13.5	-25 37.6	12 52.1	- 8 53.4	+0.1908	0.5790	-0.1340	+36	-34
50 B. Scorpïi	6.4	2.39	13.7	24 29.4	13 6.5	- 8 39.5	-1.0049	0.5791	0.1334	-29	-90
65 B. Scorpïi	5.5	2.41	13.2	26 5.9	14 45.4	- 7 4.6	+0.4245	0.5799	0.1288	+48	-21
85 B. Scorpïi	6.0	2.39	13.2	25 15.6	17 27.2	- 4 29.1	-0.7709	0.5813	0.1212	-15	-90
σ Scorpïi	3.1	2.38	-13.0	25 23.3	19 56.3	- 2 5.8	-0.9324	0.5824	-0.1141	-26	-90
NEW MOON.											
36 B. Capricorni	6.2	+2.61	+ 1.0	-22 40.8	29 0 23.0	- 1 31.2	-0.2887	0.5442	+0.1684	+16	-61
17 Capricorni	5.8	2.63	2.2	21 49.8	8 1.8	+ 5 52.1	+0.1444	0.5372	0.1827	+39	-36
20 Capricorni	6.2	2.62	3.6	19 22.3	14 22.5	-11 59.6	-1.3031	0.5313	0.1935	-48	-90
η Capricorni	4.8	+2.65	+ 3.7	-20 11.9	16 39.3	- 9 47.3	+0.0309	0.5293	+0.1971	+35	-42
27 Capricorni	6.1	2.69	3.9	20 54.3	19 6.6	- 7 24.7	+1.2813	0.5271	0.2009	+69	+38
30 Capricorni	5.4	2.65	5.1	18 20.9	23 13.6	- 3 25.5	-0.6357	0.5235	0.2070	+ 3	-88
31 Capricorni	6.3	2.65	5.2	17 49.6	23 22.9	- 3 16.5	-1.1678	0.5233	0.2072	-31	-90
γ Capricorni	3.8	2.71	6.8	17 3.2	30 10 14.6	+ 7 15.1	+0.3232	0.5142	0.2212	+54	-27
45 Capricorni	5.8	+2.67	+ 7.6	-15 8.8	12 16.0	+ 9 12.8	-1.2965	0.5126	+0.2236	-41	-90
δ Capricorni	3.0	2.73	7.2	16 31.2	13 46.8	+10 40.9	+0.5350	0.5114	0.2253	+67	-16
ϵ Aquarii	4.4	2.74	9.2	14 17.4	23 52.6	- 3 31.2	+0.4365	0.5039	0.2354	+63	-22
42 Aquarii	5.5	2.76	10.2	13 15.8	31 5 22.8	+ 1 49.6	+0.6256	0.5002	0.2401	+75	-12
σ Aquarii	4.9	2.77	11.7	11 7.2	12 51.1	+ 9 5.2	+0.0980	0.4956	0.2456	+46	-39
58 Aquarii	6.4	+2.78	+11.7	-11 20.9	13 24.8	+ 9 38.0	+0.4857	0.4952	+0.2460	+68	-19
213 B. Aquarii	6.5	+2.79	+13.2	- 8 45.8	19 39.3	- 8 17.9	-0.8009	0.4918	+0.2497	+ 1	-90

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1913.

THE STAR'S			IMMERSION.				EMERSION.				Dura- tion of Occul- tation	
			Washington		Angle from—		Washington		Angle from—			
Date.	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.		
			h m	h m	°	°	h m	h m	°	°	h m	
Jan.	2	42 Libræ	5.0	11 23	16 33	74	119	12 11	17 21	343	22	0 48
	19	406 B. Tauri	5.6	10 33	14 37	99	39	11 31	15 34	276	219	0 57
	20	49 Aurigæ	5.1	0 29	4 31	6	60	0 40	4 42	342	38	0 11
	21	ε Geminorum	5.5	1 2	5 0	91	143	1 56	5 53	274	330	0 53
	21	4 Cancrī	6.2	9 15	13 11	88	41	10 19	14 15	318	261	1 4
	23	34 Leonis	6.4	13 32	17 19	174	123	14 12	17 59	254	201	0 40
	24	χ Leonis	4.7	11 41	15 25	118	102	12 51	16 34	321	287	1 9
	25	β Virginis	3.8	6 54	10 35	101	151	7 52	11 32	324	12	0 57
	26	319 B. Virginis	6.3	10 38	14 14	125	156	11 52	15 28	316	330	1 14
	Feb. 11	π Piscium	5.6	5 46	8 20	40	347	6 48	9 22	269	216	1 2
	12	27 Arietis	† 6.4	9 22	11 51	86	36	10 14	12 44	244	199	0 53
	15	38 B. Aurigæ	6.5	2 44	5 3	42	103	3 52	6 10	284	332	1 7
	15	47 B. Aurigæ	6.0	5 59	8 17	17	334	6 33	8 51	330	276	0 34
	15	354 B. Tauri	6.4	11 17	13 34	31	336	11 42	13 59	337	284	0 25
	18	λ Cancrī	5.9	3 45	5 52	108	166	4 50	6 57	273	332	1 5
	21	89 Leonis	5.7	14 18	16 11	118	76	15 21	17 14	314	266	1 3
	22	162 B. Virginis	6.2	15 25	17 14	205	165	15 39	17 28	228	186	0 14
	23	g Virginis	† 5.6	7 5	8 52	129	180	7 59	9 46	294	343	0 54
	25	47 G. Libræ	6.1	13 16	14 54	99	121	14 29	16 7	325	332	1 13
	26	48 B. Scorpīi	4.9	14 10	15 44	52	74	14 46	16 20	359	14	0 36
Mar.	3	56 B. Capricorni	† 6.3	15 34	16 48	73	122	16 46	18 0	266	307	1 12
	12	47 Arietis	5.8	6 8	6 48	46	351	7 16	7 56	276	219	1 8
	13	28 Tauri	5.2	5 0	5 36	135	91	5 39	6 15	189	137	0 39
	17	ω Cancrī	5.9	9 15	9 35	65	17	10 4	10 23	343	287	0 48
	17	4 Cancrī	6.2	9 42	10 2	113	59	10 54	11 13	296	236	1 11
	19	34 Leonis	6.4	15 28	15 39	132	78	16 19	16 30	287	235	0 51
	22	319 B. Virginis	6.3	11 4	11 4	71	96	11 40	11 40	11	28	0 36
	Apr. 12	49 Aurigæ	5.1	8 22	7 0	142	83	9 22	7 59	242	180	0 59
	17	89 Leonis	5.7	15 15	13 32	100	53	16 11	14 28	327	276	0 56
	18	162 B. Virginis	6.2	16 28	14 41	165	118	17 14	15 27	259	210	0 46
	19	g Virginis	5.6	8 11	6 21	113	162	9 9	7 19	315	0	0 58
	21	47 G. Libræ	6.1	12 32	10 34	108	139	13 43	11 44	316	333	1 10
	22	48 B. Scorpīi	4.9	11 44	9 42	105	149	12 48	10 46	306	343	1 4
	22	65 B. Scorpīi	5.5	14 17	12 14	96	118	15 33	13 30	312	318	1 16
	25	183 B. Sagittarii	6.2	15 25	13 10	120	160	16 34	14 19	240	269	1 9
May	29	182 B. Aquarii	6.2	18 49	16 18	27	68	19 56	17 25	273	306	1 7
	June 14	χ Leonis	4.7	8 26	4 58	128	170	9 41	6 12	306	333	1 14
	12	f Virginis	6.0	13 29	8 6	150	134	14 40	9 17	289	258	1 11
	13	550 B. Virginis	† 6.0	17 53	12 26	112	65	18 56	13 28	298	247	1 2
	18	C.D.—28°14'26.8"†	6.4	13 17	7 31	52	101	14 2	8 16	326	10	0 45
	21	χ Capricorni	5.3	20 46	14 47	108	112	21 42	15 43	187	178	0 56
	21	27 Capricorni	6.1	22 26	16 26	357	339	23 7	17 8	297	271	0 42
	22	152 B. Capricorni	6.5	17 11	11 8	5	52	17 43	11 40	313	357	0 32
	July 24	317 B. Aquarii	6.3	19 18	13 6	4	50	20 1	13 50	291	333	0 44
	13	π Scorpīi	3.0	16 26	9 1	105	98	17 51	10 26	289	264	1 25
	17	ω Sagittarii	4.8	19 56	12 14	114	113	20 55	13 13	200	186	0 59

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb, toward the east.

† Immersion below the horizon of Washington.
‡ Emersion below the horizon of Washington.

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1913.

Date.		THE STAR'S		IMMERSION.				EMERSION.				Duration of Occultation.	
				Washington		Angle from—		Washington		Angle from—			
Name.		Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.			
			h m	h m	°	°	h m	h m	°	°	h m		
July	21	h Aquarii	5.4	20 3	12 5	9	47	20 58	13 0	282	311	0 55	
	27	16 Tauri	5.4	0 56	16 34	16	73	1 48	17 26	288	341	0 52	
	27	17 Tauri	3.8	0 35	16 13	58	116	1 50	17 28	247	299	1 15	
	29	107 B. Aurigæ †	6.5	21 49	13 20	105	150	22 34	14 4	234	284	0 44	
Aug.	8	17 G. Libræ	6.4	17 4	7 57	120	90	18 19	9 11	284	243	1 14	
	8	18 G. Libræ	6.1	17 47	8 39	131	95	18 54	9 46	268	223	1 7	
	18	337 B. Aquarii	6.4	17 47	8 0	42	93	18 48	9 1	261	310	1 1	
	18	342 B. Aquarii	6.5	19 32	9 44	2	47	20 14	10 26	291	333	0 42	
	21	π Piscium †	5.6	18 26	8 27	68	117	19 20	9 21	236	288	0 54	
	27	134 B. Geminorum	6.5	23 56	13 33	91	139	0 48	14 25	270	322	0 52	
	Sept.	11	27 Capricorni	6.1	23 48	12 26	62	29	0 59	13 36	231	189	1 10
		12	152 B. Capricorni	6.5	18 48	7 22	52	88	20 12	8 46	250	271	1 24
14		317 B. Aquarii	6.3	21 23	9 49	118	147	21 52	10 18	158	180	0 29	
19		47 Arietis	5.8	20 23	8 30	30	81	21 8	9 15	278	332	0 45	
	20	η Tauri †	3.0	19 43	7 46	58	101	20 31	8 33	63	311	0 47	
	20	27 Tauri †	3.7	20 19	8 22	99	146	21 4	9 6	219	270	0 44	
	20	28 Tauri †	5.2	20 20	8 22	81	128	21 10	9 13	237	289	0 51	
	24	4 Cancri	6.2	4 36	16 21	59	119	5 32	17 17	324	21	0 56	
Oct.	5	W Sagitt. (var.) †	4.3	21 30	8 33	127	89	22 15	9 19	211	166	0 46	
	7	ω Sagittarii	4.8	19 15	6 11	84	91	20 42	7 37	233	222	1 26	
	11	h Aquarii	5.4	20 20	7 0	41	77	21 42	8 22	243	264	1 22	
	11	φ Aquarii †	4.4	4 1	14 40	87	38	4 55	15 34	209	158	0 54	
	16	ε Arietis (mean)	4.6	7 15	17 34	31	334	8 5	18 24	299	243	0 50	
	17	16 Tauri	5.4	2 44	13 0	90	127	4 5	14 20	221	202	1 20	
	17	γ Tauri	4.3	3 7	13 22	62	86	4 36	14 51	251	214	1 29	
	17	20 Tauri	4.1	3 29	13 45	98	107	4 47	15 2	218	178	1 17	
	17	21 Tauri	5.8	3 39	13 54	59	60	5 7	15 22	258	210	1 28	
	17	22 Tauri	6.5	3 42	13 57	68	66	5 12	15 27	250	201	1 30	
	20	49 Aurigæ	5.1	1 52	11 56	74	135	3 0	13 4	275	338	1 8	
	20	54 Aurigæ	5.8	4 31	14 35	20	80	4 59	15 2	341	37	0 27	
	21	c Geminorum	5.5	7 0	16 59	96	127	8 23	18 22	302	267	1 23	
	25	80 Leonis	6.4	7 27	17 10	121	170	8 33	18 16	308	350	1 6	
	Nov.	8	342 B. Aquarii	6.5	20 0	4 50	44	87	21 18	6 7	242	275	1 17
		15	354 B. Tauri	6.4	3 44	12 5	94	149	5 8	13 29	246	255	1 24
17		47 Geminorum	5.6	0 0	8 14	33	81	0 29	8 43	326	18	0 29	
17		134 B. Geminorum	6.5	2 5	10 18	77	136	3 9	11 22	284	345	1 4	
	20	34 Leonis	6.4	5 57	13 58	50	103	6 24	14 25	4	56	0 27	
	Dec.	5	φ Aquarii	4.4	20 4	3 8	32	73	21 19	4 22	255	283	1 14
		5	96 Aquarii	5.7	0 28	7 31	61	41	1 47	8 50	217	182	1 19
		7	60 Piscium	6.2	3 41	10 36	104	60	4 32	11 27	190	142	0 51
7		62 Piscium	6.1	4 53	11 47	13	323	5 42	12 36	286	234	0 49	
	10	47 Arietis	5.8	21 47	4 31	50	106	22 48	5 32	252	308	1 1	
	11	23 Tauri †	4.3	20 7	2 48	56	102	20 56	3 36	264	314	0 48	
	11	η Tauri	3.0	20 39	3 20	42	90	21 26	4 6	277	329	0 46	
	11	27 Tauri	3.7	21 12	3 52	84	135	22 4	4 44	232	287	0 52	
	11	28 Tauri	5.2	21 15	3 55	66	118	22 9	4 49	249	305	0 54	
	12	38 B. Aurigæ	6.5	7 31	14 6	74	13	8 43	15 18	288	226	1 12	
	13	406 B. Tauri	5.6	0 2	6 33	68	125	1 0	7 31	270	330	0 58	
	15	35 B. Cancri	6.4	11 57	18 19	130	71	12 57	19 19	282	224	1 0	
	21	i Virginis	5.7	10 34	16 33	122	157	11 44	17 43	315	338	1 10	
	31	42 Aquarii	5.5	0 21	5 42	78	49	1 28	6 48	207	168	1 6	

NOTE.—The angles of position are counted from the north point and vertex of the Moon's limb, toward the east.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE SUN.
FOR WASHINGTON MEAN NOON.

Date.	<i>P</i>	<i>B</i> ₀	<i>L</i> ₀	Date.	<i>P</i>	<i>B</i> ₀	<i>L</i> ₀
	°	°	°		°	°	°
Jan. 1	+ 1.90	−3.19	3.37	July 5	− 0.79	+3.45	81.56
6	− 0.54	3.76	297.53	10	+ 1.48	3.97	15.39
11	2.96	4.29	231.69	15	3.73	4.46	309.22
16	5.33	4.79	165.85	20	5.93	4.92	243.07
21	7.63	5.26	100.02	25	8.08	5.34	176.92
26	− 9.85	−5.68	34.19	30	+10.15	+5.73	110.78
31	11.97	6.06	328.36	Aug. 4	12.14	6.08	44.66
Feb. 5	13.98	6.38	262.52	9	14.03	6.39	338.55
10	15.86	6.66	196.69	14	15.82	6.66	272.45
15	17.61	6.89	130.85	19	17.49	6.87	206.37
20	−19.22	−7.06	65.00	24	+19.04	+7.04	140.30
25	20.68	7.18	359.15	29	20.46	7.16	74.24
Mar. 2	21.98	7.24	293.29	Sept. 3	21.75	7.23	8.19
7	23.13	7.25	227.42	8	22.89	7.25	302.16
12	24.11	7.20	161.53	13	23.88	7.21	236.14
17	−24.93	−7.09	95.62	18	+24.72	+7.12	170.13
22	25.57	6.93	29.70	23	25.40	6.98	104.14
27	26.04	6.72	323.76	28	25.92	6.79	38.15
Apr. 1	26.33	6.47	257.80	Oct. 3	26.26	6.55	332.18
6	26.44	6.16	191.82	8	26.42	6.26	266.21
11	−26.36	−5.81	125.82	13	+26.40	+5.92	200.25
16	26.11	5.42	59.80	18	26.20	5.54	134.30
21	25.67	4.99	353.76	23	25.80	5.11	68.36
26	25.05	4.53	287.70	28	25.21	4.64	2.42
May 1	24.24	4.03	221.62	Nov. 2	24.42	4.14	296.49
6	−23.25	−3.51	155.53	7	+23.43	+3.60	230.56
11	22.08	2.96	89.41	12	22.25	3.04	164.64
16	20.75	2.40	23.29	17	20.88	2.45	98.73
21	19.26	1.82	317.15	22	19.32	1.84	32.83
26	17.61	1.22	250.99	27	17.59	1.22	326.93
31	−15.82	−0.62	184.83	Dec. 2	+15.69	+0.58	261.03
June 5	13.90	−0.02	118.65	7	13.65	−0.06	195.15
10	11.88	+0.58	52.47	12	11.48	0.70	129.27
15	9.77	1.18	346.29	17	9.21	1.33	63.39
20	7.58	1.77	280.11	22	6.86	1.96	357.53
25	− 5.35	+2.35	213.92	27	+ 4.46	−2.57	291.67
30	− 3.08	+2.91	147.74	32	+ 2.02	−3.16	225.82

In the above table, *P* is the position-angle of the axis of rotation measured eastward from the north point of the disk, while *L*₀ and *B*₀ are the heliographic longitudes and latitudes, respectively, of the center of the disk. The longitudes are reckoned from the Solar Meridian which passed through the ascending node of the Sun's equator on the ecliptic, on Jan. 1, 1854, Greenwich Mean Noon.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Jan.	1	+6.00	+3.60	+0.01	+0.03	203.20	−1.52	17.21
	2	5.82	4.74	0.01	0.03	215.37	1.52	13.72
	3	5.46	5.63	0.01	0.03	227.55	1.53	9.38
	4	4.94	6.23	0.01	0.03	239.73	1.53	4.42
	5	4.25	6.52	0.01	0.03	251.92	1.53	359.17
	6	+3.41	+6.51	+0.01	+0.03	264.10	−1.53	354.03
	7	2.42	6.20	0.01	0.03	276.29	1.53	349.36
	8	1.28	5.62	+0.01	0.03	288.48	1.53	345.43
	9	+0.01	4.79	0.00	0.03	300.67	1.52	342.35
	10	−1.36	3.76	0.00	0.03	312.85	1.52	340.13
	11	−2.77	+2.58	0.00	+0.03	325.03	−1.51	338.74
	12	4.16	+1.28	0.00	0.03	337.20	1.50	338.12
	13	5.45	−0.09	0.00	0.03	349.37	1.49	338.26
	14	6.54	1.48	0.00	0.03	1.53	1.48	339.18
	15	7.34	2.83	0.00	0.03	13.68	1.47	340.97
	16	−7.76	−4.08	0.00	+0.03	25.83	−1.46	343.74
	17	7.71	5.15	0.00	0.03	37.98	1.44	347.59
	18	7.15	5.97	0.00	0.02	50.11	1.43	352.53
	19	6.07	6.46	0.00	0.02	62.25	1.41	358.36
	20	4.54	6.54	0.00	0.02	74.38	1.40	4.57
	21	−2.66	−6.18	0.00	+0.02	86.50	−1.38	10.44
	22	−0.61	5.37	0.00	0.02	98.62	1.36	15.32
	23	+1.43	4.19	0.00	0.02	110.75	1.34	18.87
	24	3.28	2.72	0.00	0.02	122.88	1.33	21.04
	25	4.82	−1.09	0.00	0.02	135.01	1.31	21.92
	26	+5.97	+0.58	0.00	+0.02	147.15	−1.29	21.64
	27	6.72	2.16	0.00	0.02	159.30	1.28	20.30
	28	7.07	3.58	0.00	0.02	171.45	1.26	17.95
	29	7.07	4.77	0.00	0.02	183.62	1.25	14.65
	30	6.78	5.68	0.00	0.03	195.78	1.24	10.49
Feb.	31	+6.24	+6.30	0.00	+0.03	207.96	−1.23	5.66
	1	5.49	6.62	0.00	0.03	220.14	1.22	0.48
	2	4.57	6.63	0.00	0.03	232.32	1.21	355.32
	3	3.52	6.34	0.00	0.03	244.51	1.20	350.54
	4	2.34	5.77	0.00	0.03	256.70	1.19	346.43
	5	+1.07	+4.95	0.00	+0.03	268.90	−1.18	343.13
	6	−0.28	3.92	0.00	0.03	281.09	1.16	340.68
	7	1.67	2.73	−0.01	0.03	293.28	1.14	339.06
	8	3.07	1.42	0.01	0.03	305.47	1.13	338.22
	9	4.42	+0.04	0.01	0.03	317.66	1.11	338.14
	10	−5.66	−1.36	−0.01	+0.02	329.85	−1.09	338.83
	11	6.73	2.71	0.01	0.02	342.03	1.07	340.33
	12	7.54	3.97	0.01	0.02	354.20	1.04	342.73
	13	8.01	5.07	0.01	0.02	6.37	1.02	346.11
	14	8.07	5.93	0.01	0.02	18.53	1.00	350.53
	15	−7.66	−6.50	−0.01	+0.02	30.68	−0.97	355.88
	16	−6.75	−6.70	−0.01	+0.02	42.83	−0.94	1.83

EPHEMERIS FOR
FOR

OBSERVATIONS OF THE MOON.
MEAN

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
Apr.	1	+2.00	+4.48	−0.01	+0.02	218.48	+0.25	341.91
	2	+0.61	3.33	0.01	0.02	230.69	0.27	339.85
	3	−0.77	2.03	0.01	0.02	242.91	0.29	338.59
	4	2.08	+0.64	0.01	0.02	255.13	0.31	338.10
	5	3.26	−0.80	0.01	0.02	267.35	0.33	338.38
	6	−4.29	−2.21	−0.02	+0.02	279.57	+0.35	339.46
	7	5.13	3.54	0.02	0.02	291.80	0.37	341.40
	8	5.76	4.71	0.02	0.02	304.02	0.40	344.28
	9	6.14	5.67	0.02	0.02	316.24	0.42	348.15
	10	6.28	6.36	0.02	0.02	328.45	0.44	352.93
	11	−6.17	−6.73	−0.02	+0.02	340.66	+0.47	358.40
	12	5.79	6.73	0.02	0.02	352.87	0.50	4.14
	13	5.14	6.34	0.02	0.02	5.07	0.53	9.60
	14	4.25	5.58	0.02	0.02	17.26	0.56	14.32
	15	3.13	4.45	0.01	0.02	29.44	0.59	17.98
	16	−1.82	−3.02	−0.01	+0.02	41.62	+0.62	20.45
	17	−0.38	−1.38	0.01	0.02	53.80	0.66	21.73
	18	+1.12	+0.35	0.01	0.02	65.97	0.69	21.84
	19	2.57	2.05	0.01	0.02	78.14	0.73	20.80
	20	3.88	3.61	0.01	0.02	90.31	0.76	18.59
	21	+4.95	+4.91	−0.01	+0.02	102.48	+0.79	15.23
	22	5.70	5.89	−0.01	0.02	114.65	0.82	10.83
	23	6.08	6.50	0.00	0.02	126.83	0.85	5.67
	24	6.06	6.76	0.00	0.02	139.01	0.87	0.16
	25	5.65	6.67	−0.01	0.02	151.20	0.89	354.79
	26	+4.91	+6.26	−0.01	+0.02	163.39	+0.91	349.96
	27	3.88	5.58	0.01	0.02	175.59	0.93	345.91
	28	2.65	4.67	0.01	0.02	187.80	0.95	342.73
	29	+1.29	3.57	0.01	0.02	200.01	0.96	340.41
	30	−0.10	2.32	0.01	0.02	212.23	0.97	338.91
May	1	−1.45	+0.97	−0.01	+0.02	224.46	+0.99	338.18
	2	2.68	−0.44	0.01	0.02	236.68	1.00	338.21
	3	3.72	1.85	0.01	0.02	248.92	1.01	339.03
	4	4.53	3.19	0.01	0.02	261.16	1.03	340.72
	5	5.08	4.40	0.01	0.02	273.39	1.04	343.35
	6	−5.35	−5.41	−0.01	+0.02	285.63	+1.06	346.99
	7	5.35	6.15	0.01	0.02	297.87	1.07	351.62
	8	5.10	6.57	0.01	0.01	310.11	1.09	357.03
	9	4.65	6.63	0.01	0.01	322.34	1.10	2.80
	10	4.02	6.31	0.01	0.01	334.57	1.12	8.38
	11	−3.26	−5.61	−0.01	+0.01	346.79	+1.14	13.27
	12	2.40	4.57	0.01	0.01	359.00	1.16	17.15
	13	1.44	3.25	0.01	0.01	11.21	1.19	19.88
	14	−0.43	1.72	0.01	0.02	23.42	1.21	21.46
	15	+0.62	−0.08	0.01	0.02	35.61	1.23	21.93
	16	+1.69	+1.57	−0.01	+0.02	47.80	+1.26	21.31
	17	+2.72	+3.12	0.00	+0.02	59.99	+1.28	19.58

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR WASHINGTON MEAN MIDNIGHT.

Date.		The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
		Long.	Lat.	Long.	Lat.	Colong.	Lat.	
		°	°	°	°	°	°	°
May	17	+2.72	+3.12	0.00	+0.02	59.99	+1.28	19.58
	18	3.66	4.46	0.00	0.02	72.17	1.31	16.70
	19	4.43	5.51	0.00	0.02	84.35	1.33	12.72
	20	4.96	6.23	0.00	0.02	96.54	1.35	7.82
	21	5.20	6.58	0.00	0.02	108.72	1.37	2.36
	22	+5.11	+6.58	0.00	+0.02	120.91	+1.38	356.83
	23	4.67	6.26	0.00	0.02	133.10	1.40	351.69
	24	3.91	5.64	0.00	0.02	145.30	1.41	347.28
	25	2.88	4.78	0.00	0.02	157.50	1.42	343.75
	26	1.64	3.72	0.00	0.02	169.71	1.42	341.12
	27	+0.28	+2.51	0.00	+0.02	181.93	+1.43	339.34
	28	-1.11	+1.19	-0.01	0.01	194.15	1.43	338.35
	29	2.43	-0.18	0.01	0.01	206.38	1.44	338.11
	30	3.60	1.56	0.01	0.01	218.61	1.44	338.65
	31	4.53	2.89	0.01	0.01	230.85	1.44	340.02
June	1	-5.16	-4.11	-0.01	+0.01	243.09	+1.44	342.31
	2	5.45	5.15	0.01	0.01	255.34	1.45	345.62
	3	5.39	5.94	0.01	0.01	267.58	1.45	349.99
	4	5.00	6.42	0.01	0.01	279.83	1.45	355.28
	5	4.32	6.54	0.01	0.01	292.08	1.46	1.11
	6	-3.44	-6.27	-0.01	+0.01	304.33	+1.46	6.91
	7	2.44	5.61	0.01	0.01	316.58	1.46	12.11
	8	1.40	4.60	-0.01	0.01	328.82	1.47	16.31
	9	-0.37	3.31	0.00	0.01	341.05	1.48	19.33
	10	+0.60	1.82	0.00	0.01	353.28	1.49	21.18
	11	+1.51	-0.22	0.00	+0.01	5.50	+1.50	21.92
	12	2.33	+1.39	0.00	0.01	17.71	1.51	21.59
	13	3.07	2.90	0.00	0.01	29.92	1.52	20.20
	14	3.72	4.23	0.00	0.01	42.12	1.53	17.71
	15	4.25	5.30	0.00	0.01	54.31	1.54	14.14
	16	+4.63	+6.06	0.00	+0.01	66.50	+1.55	9.59
	17	4.82	6.47	0.00	0.01	78.70	1.56	4.33
	18	4.77	6.53	0.00	0.01	90.89	1.56	358.80
	19	4.45	6.26	0.00	0.01	103.08	1.56	353.48
	20	3.86	5.69	0.00	0.01	115.27	1.57	348.77
	21	+2.99	+4.86	0.00	+0.01	127.47	+1.56	344.91
	22	1.89	3.83	0.00	0.01	139.67	1.56	341.96
	23	+0.62	2.64	0.00	0.01	151.88	1.56	339.88
	24	-0.76	+1.34	0.00	0.01	164.09	1.55	338.61
	25	2.16	-0.01	0.00	0.01	176.31	1.54	338.11
	26	-3.48	-1.37	0.00	+0.01	188.53	+1.54	338.36
	27	4.63	2.69	0.00	0.01	200.76	1.53	339.40
	28	5.51	3.91	0.00	0.01	213.00	1.52	341.32
	29	6.05	4.97	0.00	0.01	225.24	1.51	344.22
	30	6.19	5.81	0.00	0.01	237.48	1.50	348.18
July	1	-5.91	-6.36	0.00	+0.01	249.73	+1.49	353.15
	2	-5.22	-6.55	0.00	+0.01	261.98	+1.48	358.88

EPHEMERIS FOR

OBSERVATIONS OF THE MOON.

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PHEMERIS FOR PHYSICAL OBSERVATIONS OF THE MOON.
FOR WASHINGTON MEAN MIDNIGHT.

Date.	The Earth's Selenographic—		Physical Libration.		The Sun's Selenographic—		C
	Long.	Lat.	Long.	Lat.	Colong.	Lat.	
	°	°	°	°	°	°	°
16	−5.14	−6.48	0.00	−0.01	133.48	−1.38	0.90
17	5.04	6.02	0.00	0.01	145.63	1.39	6.40
18	4.76	5.22	0.00	0.01	157.78	1.39	11.41
19	4.31	4.12	+0.01	0.01	169.94	1.40	15.58
20	3.69	2.76	0.01	0.01	182.10	1.40	18.74
21	−2.88	−1.22	+0.01	−0.01	194.27	−1.41	20.84
22	1.89	+0.41	0.01	0.00	206.44	1.42	21.86
23	−0.72	2.04	0.01	0.00	218.62	1.43	21.78
24	+0.58	3.55	0.01	0.00	230.81	1.44	20.56
25	1.95	4.83	0.01	0.00	243.00	1.44	18.11
26	+3.29	+5.79	+0.01	−0.01	255.20	−1.46	14.39
27	4.48	6.37	0.01	0.01	267.40	1.47	9.55
28	5.41	6.55	0.01	0.01	279.59	1.48	3.95
29	5.98	6.34	0.01	0.01	291.78	1.49	358.14
30	6.14	5.79	0.01	0.01	303.97	1.50	352.69
1	+5.89	+4.96	+0.01	−0.01	316.16	−1.51	348.00
2	5.25	3.90	0.01	0.01	328.34	1.52	344.25
3	4.28	2.69	0.01	0.01	340.51	1.52	341.46
4	3.06	1.38	0.01	0.01	352.68	1.53	339.54
5	1.69	+0.02	+0.01	0.01	4.84	1.54	338.42
6	+0.27	−1.33	0.00	−0.01	17.00	−1.55	338.06
7	−1.11	2.63	0.00	0.01	29.15	1.56	338.46
8	2.35	3.82	0.00	0.01	41.30	1.56	339.66
9	3.39	4.86	0.00	0.01	53.43	1.56	341.73
10	4.16	5.69	0.00	0.01	65.57	1.56	344.76
11	−4.64	−6.26	0.00	−0.01	77.70	−1.56	348.79
12	4.82	6.53	0.00	0.01	89.83	1.56	353.72
13	4.73	6.45	0.00	0.01	101.95	1.55	359.24
14	4.41	6.02	0.00	0.01	114.08	1.55	4.90
15	3.91	5.24	0.00	0.01	126.21	1.54	10.18
16	−3.28	−4.15	0.00	−0.01	138.35	−1.53	14.65
17	2.57	2.80	0.00	0.01	150.48	1.52	18.08
18	1.80	−1.27	0.00	0.01	162.63	1.50	20.44
19	0.98	+0.34	0.00	0.01	174.78	1.50	21.72
20	−0.12	1.93	0.00	0.01	186.94	1.48	21.93
21	+0.79	+3.40	0.00	−0.01	199.10	−1.48	21.06
22	1.73	4.67	0.00	0.01	211.27	1.47	19.04
23	2.67	5.65	0.00	0.01	223.45	1.46	15.82
24	3.56	6.29	0.00	0.01	235.63	1.46	11.45
25	4.32	6.54	0.00	0.01	247.82	1.46	6.17
26	+4.88	+6.41	0.00	−0.01	260.01	−1.45	0.43
27	5.17	5.92	0.00	0.01	272.19	1.45	354.80
28	5.13	5.13	0.00	0.01	284.38	1.44	349.76
29	4.75	4.09	0.00	0.01	296.57	1.44	345.61
30	4.05	2.88	0.00	0.01	308.75	1.44	342.42
31	+3.05	+1.55	0.00	−0.01	320.93	−1.43	340.15
32	+1.83	+0.18	0.00	−0.01	333.10	−1.43	338.74

616 ILLUMINATED DISK OF MERCURY, 1913.

FOR WASHINGTON MEAN NOON.

Date.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.	Date.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.		
		°	°					°	°				
Jan.	1	0.728	63	188	39.4	-0.2	July	5	0.450	96	15	32.9	+0.6
	6	0.803	53	184	33.7	0.2		10	0.367	105	18	30.7	0.8
	11	0.857	44	179	29.7	0.2		15	0.281	116	22	27.7	1.1
	16	0.896	38	174	27.2	0.3		20	0.192	128	26	22.7	1.4
	21	0.927	31	168	26.0	0.3		25	0.106	142	32	14.9	1.9
	26	0.952	25	162	25.9	-0.5		30	0.037	158	47	6.0	+2.5
Feb.	31	0.971	19	154	26.9	0.6	Aug.	4	0.011	168	110	1.9	2.9
	5	0.987	13	143	29.2	0.8		9	0.047	155	169	8.3	2.3
	10	0.999	6	111	33.2	1.1		14	0.152	134	183	24.4	1.4
	15	0.998	7	20	39.5	1.2		19	0.316	112	190	44.4	+0.6
	20	0.974	19	351	48.5	-1.2		24	0.517	88	196	61.4	-0.2
Mar.	25	0.914	34	341	59.6	1.2		29	0.717	64	202	69.3	0.8
	2	0.792	54	336	69.2	1.0	Sept.	3	0.872	42	208	65.7	1.1
	7	0.609	77	333	69.9	-0.5		8	0.959	23	216	55.6	1.3
	12	0.390	103	330	56.1	+0.2		13	0.994	9	236	45.3	1.4
	17	0.194	128	326	33.2	+1.0		18	0.997	6	345	37.1	-1.2
	22	0.059	152	316	11.3	2.0		23	0.985	14	14	31.9	0.9
Apr.	27	0.005	172	262	1.0	3.0		28	0.965	22	20	28.5	0.6
	1	0.031	160	171	5.6	2.5	Oct.	3	0.940	28	22	26.7	0.4
	6	0.109	141	159	16.3	1.8		8	0.911	35	23	26.0	0.3
	11	0.206	126	155	25.0	+1.3		13	0.877	41	23	26.6	-0.2
	16	0.301	113	153	29.6	1.0		18	0.836	48	22	28.2	0.1
	21	0.388	103	152	31.7	0.8		23	0.784	55	21	31.1	-0.1
May	26	0.470	93	151	32.9	0.6		28	0.714	65	20	35.4	0.0
	1	0.547	85	151	34.1	0.4	Nov.	2	0.620	76	18	40.9	0.0
	6	0.622	76	152	36.1	+0.2		7	0.488	91	16	45.8	+0.2
	11	0.702	66	153	39.5	-0.1		12	0.312	112	15	43.7	0.6
	16	0.788	55	155	44.8	0.4		17	0.115	140	15	23.5	1.4
	21	0.876	41	158	52.2	0.9		22	0.001	176	349	0.4	3.0
	26	0.955	25	163	60.7	1.4		27	0.086	146	205	19.6	1.6
	31	0.998	5	186	66.8	-1.9	Dec.	2	0.303	113	203	49.2	+0.4
June	5	0.981	16	340	66.3	1.6		7	0.516	88	201	55.1	-0.1
	10	0.910	35	350	59.6	1.2		12	0.672	70	198	48.5	0.3
	15	0.813	51	357	51.1	0.7		17	0.778	56	194	40.4	0.3
	20	0.713	65	3	44.0	-0.2		22	0.850	46	190	34.1	0.3
	25	0.620	76	7	38.9	+0.1		27	0.898	37	185	29.6	-0.4
	30	0.535	86	11	35.5	+0.4		32	0.932	30	180	26.9	-0.4

NOTATION.

k=the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i=the angle between the Sun and Earth, as seen from the planet.

θ =the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L=the brilliancy of the disk. The unit of *L* is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

The magnitudes of the planet have been computed from formulæ given in the Potsdam Observations, vol. 8, page 366.

FOR WASHINGTON MEAN NOON.

Date.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.	Date.	<i>k</i>	<i>i</i>	θ	<i>L</i>	Stellar Mag.
		°	°					°	°		
Jan. 1	0.692	67.5	342.5	96.7	-3.7	July 5	0.506	89.3	163.9	135.0	-3.9
6	0.674	69.7	341.0	101.3	3.7	10	0.533	86.3	165.7	127.6	3.9
11	0.655	71.9	339.7	106.3	3.8	15	0.558	83.4	167.6	120.7	3.8
16	0.636	74.2	338.6	111.7	3.8	20	0.582	80.7	169.8	114.4	3.8
21	0.616	76.6	337.7	117.5	3.8	25	0.605	78.0	172.1	108.7	3.8
26	0.595	79.1	337.0	123.9	-3.9	30	0.626	75.4	174.5	103.5	-3.7
Feb. 31	0.573	81.7	336.4	130.9	3.9	Aug. 4	0.647	72.9	177.0	98.8	3.7
5	0.549	84.4	336.0	138.4	4.0	9	0.667	70.5	179.6	94.5	3.7
10	0.524	87.3	335.7	146.4	4.0	14	0.686	68.1	182.2	90.6	3.6
15	0.497	90.4	335.5	154.9	4.1	19	0.705	65.8	184.9	87.0	3.6
20	0.468	93.6	335.4	163.9	-4.1	24	0.723	63.5	187.5	83.8	-3.6
Mar. 25	0.438	97.1	335.3	173.3	4.2	29	0.740	61.3	190.1	80.8	3.5
2	0.406	100.9	335.2	182.4	4.2	Sept. 3	0.757	59.1	192.6	78.1	3.5
7	0.371	105.0	335.1	190.8	4.2	8	0.773	56.9	194.9	75.6	3.5
12	0.334	109.4	334.9	198.2	4.3	13	0.789	54.8	197.1	73.2	3.5
17	0.294	114.4	334.5	202.3	-4.3	18	0.804	52.7	199.1	71.1	-3.5
Apr. 22	0.251	119.9	333.7	201.3	4.3	23	0.818	50.6	200.9	69.2	3.4
27	0.205	126.1	332.5	192.9	4.3	28	0.832	48.5	202.5	67.3	3.4
1	0.158	133.2	330.5	173.5	4.2	Oct. 3	0.845	46.4	203.8	65.5	3.4
6	0.111	141.0	327.5	141.3	4.1	8	0.857	44.4	204.9	64.0	3.4
11	0.068	149.7	322.6	97.9	-3.8	13	0.869	42.4	205.7	62.6	-3.4
May 16	0.032	159.3	313.7	51.5	3.6	18	0.881	40.4	206.2	61.2	3.4
21	0.011	167.9	296.9	18.9	3.2	23	0.892	38.4	206.5	59.9	3.4
26	0.005	171.6	223.6	9.1	3.0	28	0.902	36.5	206.5	58.7	3.4
1	0.019	164.2	181.4	30.9	3.4	Nov. 2	0.912	34.6	206.2	57.6	3.4
6	0.048	154.7	168.6	71.5	-3.6	7	0.921	32.7	205.7	56.5	-3.4
May 11	0.088	145.6	163.1	114.9	3.9	12	0.929	30.8	204.8	55.5	3.4
16	0.133	137.3	160.2	150.0	4.1	17	0.937	29.0	203.6	54.6	3.4
21	0.179	129.9	158.6	172.3	4.2	22	0.945	27.2	202.1	53.7	3.4
26	0.225	123.4	157.9	183.5	4.2	27	0.952	25.4	200.3	52.9	3.4
31	0.269	117.5	157.6	186.1	-4.2	Dec. 2	0.958	23.6	198.2	52.1	-3.4
June 5	0.310	112.3	157.7	183.1	4.2	7	0.964	21.8	195.8	51.4	3.4
10	0.349	107.6	158.1	177.1	4.2	12	0.970	20.1	193.1	50.8	3.4
15	0.384	103.4	158.8	168.9	4.1	17	0.975	18.4	190.1	50.2	3.4
20	0.418	99.5	159.8	160.3	4.1	22	0.979	16.7	186.8	49.6	3.4
25	0.449	95.9	160.9	151.5	-4.0	27	0.983	15.0	183.3	49.1	-3.4
30	0.478	92.5	162.3	143.0	-4.0	32	0.986	13.4	179.6	48.7	-3.4

NOTATION.

k=the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i=the angle between the Sun and Earth, as seen from the planet.

θ =the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

L=the brilliancy of the disk. The unit of *L* is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the Sun, and illuminated by the latter as the mean disk of the planet is illuminated.

The magnitudes of the planet have been computed from formulæ given in the Potsdam Observations, vol. 8, page 366.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.
WASHINGTON MEAN TIME.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

con.	k	Diameter.	i	q	Q	Central Meridian.	Transit of Zero Meridian.	
							Of Date.	Of Intermediate Date.
		"	°	"	°	°	h m	h m
1	0.892	6.23	38.44	0.68	251.18	194.69	11 19.8	12 0.1
3	0.891	6.26	38.63	0.69	251.57	175.08	12 40.4	13 20.7
5	0.890	6.29	38.82	0.70	251.97	155.48	14 1.0	14 41.2
7	0.889	6.33	39.00	0.71	252.38	135.88	15 21.5	16 1.8
9	0.888	6.36	39.18	0.72	252.80	116.30	16 42.0	17 22.2
11	0.887	6.40	39.36	0.73	253.23	96.73	18 2.5	18 42.7
13	0.886	6.44	39.53	0.74	253.68	77.18	19 22.8	20 3.0
15	0.885	6.48	39.70	0.75	254.13	57.63	20 43.2	21 23.4
17	0.884	6.52	39.87	0.76	254.59	38.10	22 3.5	22 43.6
19	0.883	6.56	40.03	0.77	255.06	18.58	23 23.7	. . . . .
21	0.882	6.60	40.19	0.78	255.54	359.07	0 3.8	0 43.9
23	0.881	6.64	40.35	0.79	256.02	339.57	1 24.0	2 4.1
25	0.880	6.69	40.50	0.80	256.51	320.07	2 44.1	3 24.2
27	0.879	6.73	40.65	0.81	257.01	300.59	4 4.2	4 44.2
29	0.878	6.78	40.80	0.82	257.51	281.12	5 24.2	6 4.2
31	0.878	6.83	40.94	0.84	258.01	261.67	6 44.2	7 24.2
2	0.877	6.87	41.08	0.85	258.52	242.22	8 4.2	8 44.1
4	0.876	6.92	41.21	0.86	259.03	222.78	9 24.1	10 4.0
6	0.875	6.97	41.34	0.87	259.55	203.36	10 43.9	11 23.8
8	0.875	7.02	41.46	0.88	260.07	183.95	12 3.7	12 43.6
10	0.874	7.08	41.58	0.89	260.60	164.54	13 23.5	14 3.4
12	0.873	7.13	41.69	0.90	261.13	145.14	14 43.2	15 23.1
14	0.873	7.19	41.80	0.91	261.66	125.76	16 2.9	16 42.7
16	0.872	7.24	41.90	0.93	262.19	106.38	17 22.5	18 2.3
18	0.872	7.30	42.00	0.94	262.73	87.02	18 42.1	19 21.9
20	0.871	7.36	42.09	0.95	263.26	67.66	20 1.6	20 41.4
22	0.871	7.42	42.18	0.96	263.80	48.31	21 21.1	22 0.9
24	0.870	7.48	42.26	0.97	264.33	28.98	22 40.6	23 20.3
26	0.870	7.55	42.33	0.98	264.86	9.66	. . . . .	0 0.0
28	0.869	7.61	42.40	0.99	265.39	350.35	0 39.7	1 19.4
30	0.869	7.68	42.46	1.01	265.91	331.04	1 59.0	2 38.7
1	0.869	7.75	42.51	1.02	266.43	311.74	3 18.3	3 58.0
3	0.868	7.83	42.56	1.03	266.95	292.46	4 37.6	5 17.2
5	0.868	7.90	42.60	1.04	267.47	273.19	5 56.8	6 36.4
7	0.868	7.98	42.63	1.05	267.99	253.93	7 15.9	7 55.5
9	0.868	8.05	42.65	1.06	268.50	234.68	8 35.0	9 14.6
11	0.868	8.13	42.66	1.08	269.00	215.44	9 54.1	10 33.6
13	0.868	8.22	42.66	1.09	269.50	196.21	11 13.1	11 52.6
15	0.868	8.30	42.65	1.10	269.99	176.99	12 32.1	13 11.6
17	0.868	8.39	42.64	1.11	270.47	157.79	13 51.0	14 30.4
19	0.868	8.48	42.61	1.12	270.95	138.60	15 9.9	15 49.3
21	0.868	8.58	42.57	1.13	271.42	119.42	16 28.7	17 8.0
23	0.869	8.67	42.52	1.14	271.88	100.25	17 47.4	18 26.8
25	0.869	8.77	42.46	1.15	272.33	81.09	19 6.1	19 45.4
27	0.869	8.87	42.38	1.16	272.77	61.95	20 24.7	21 4.0
29	0.870	8.97	42.29	1.17	273.20	42.83	21 43.3	22 22.6
1	0.871	9.08	42.18	1.18	273.62	23.72	23 1.8	23 41.0

EPHEMERIS FOR
W

OBSERVATIONS OF MARS.
MEAN TIME.

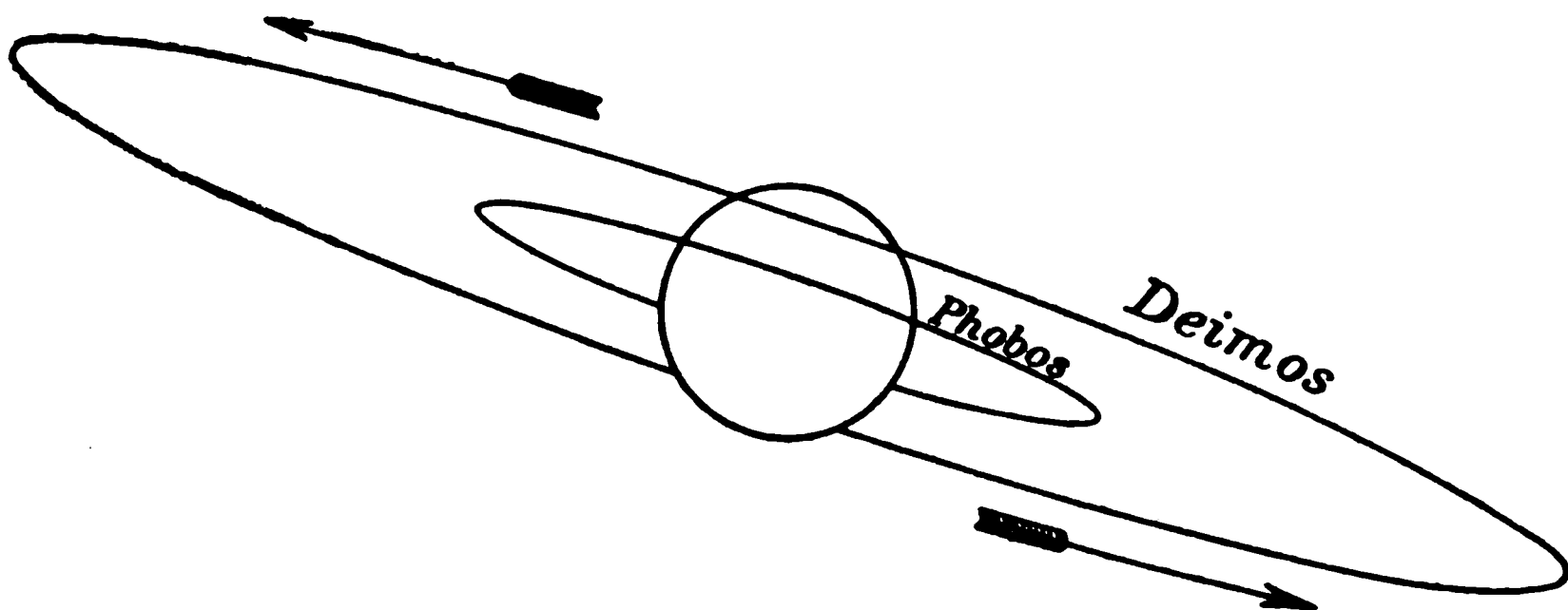
EPHEMERIS FOR PHYSICAL OBSERVATIONS OF MARS.

WASHINGTON MEAN TIME.

Noon.		k	Diame- ter.	i	q	Q	Central Meridian.	Transit of Zero Meridian.	
								Of Date.	Of Intermedi- ate Date.
			"	°	"	°	°	h m	h m
Oct.	1	0.871	9.08	42.18	1.18	273.62	23.72	23 1.8	23 41.0
	3	0.871	9.19	42.06	1.18	274.03	4.63	. . . . .	0 20.2
	5	0.872	9.30	41.93	1.19	274.43	345.55	0 59.4	1 38.5
	7	0.873	9.42	41.78	1.20	274.82	326.49	2 17.7	2 56.8
	9	0.874	9.54	41.61	1.20	275.19	307.45	3 35.9	4 15.0
	11	0.875	9.67	41.42	1.21	275.55	288.43	4 54.0	5 33.1
	13	0.876	9.80	41.21	1.21	275.90	269.42	6 12.1	6 51.1
	15	0.877	9.93	40.98	1.22	276.23	250.44	7 30.1	8 9.0
	17	0.879	10.07	40.73	1.22	276.55	231.48	8 48.0	9 26.9
	19	0.880	10.21	40.46	1.22	276.85	212.54	10 5.8	10 44.6
	21	0.882	10.35	40.16	1.22	277.13	193.62	11 23.4	12 2.2
	23	0.884	10.50	39.84	1.22	277.40	174.73	12 41.0	13 19.8
	25	0.886	10.66	39.50	1.22	277.65	155.86	13 58.5	14 37.2
	27	0.888	10.82	39.13	1.21	277.88	137.02	15 15.8	15 54.4
	29	0.890	10.98	38.72	1.21	278.10	118.21	16 33.0	17 11.6
Nov.	31	0.892	11.15	38.28	1.20	278.30	99.44	17 50.1	18 28.6
	2	0.895	11.32	37.82	1.19	278.47	80.69	19 7.1	19 45.5
	4	0.898	11.50	37.34	1.18	278.62	61.97	20 23.9	21 2.2
	6	0.900	11.68	36.82	1.16	278.75	43.29	21 40.5	22 18.8
	8	0.903	11.86	36.25	1.15	278.86	24.64	22 57.0	23 35.2
	10	0.906	12.05	35.64	1.13	278.94	6.03	. . . . .	0 13.4
	12	0.910	12.24	34.99	1.10	279.00	347.46	0 51.5	1 29.5
	14	0.913	12.44	34.31	1.08	279.03	328.93	2 7.6	2 45.6
	16	0.917	12.64	33.59	1.06	279.02	310.44	3 23.5	4 1.4
	18	0.920	12.84	32.83	1.03	278.98	291.99	4 39.2	5 17.0
	20	0.924	13.05	32.02	0.99	278.91	273.59	5 54.7	6 32.4
	22	0.928	13.26	31.15	0.96	278.81	255.23	7 10.0	7 47.6
	24	0.932	13.47	30.24	0.92	278.67	236.92	8 25.1	9 2.6
	26	0.936	13.68	29.28	0.87	278.49	218.66	9 40.0	10 17.4
	28	0.940	13.89	28.27	0.83	278.26	200.46	10 54.7	11 32.0
Dec.	30	0.945	14.10	27.21	0.78	277.98	182.30	12 9.2	12 46.3
	2	0.949	14.31	26.09	0.73	277.65	164.20	13 23.4	14 0.4
	4	0.953	14.51	24.92	0.67	277.27	146.14	14 37.4	15 14.3
	6	0.958	14.71	23.70	0.62	276.83	128.14	15 51.2	16 28.0
	8	0.962	14.91	22.42	0.56	276.30	110.19	17 4.7	17 41.4
	10	0.966	15.10	21.10	0.51	275.68	92.29	18 18.1	18 54.7
	12	0.971	15.27	19.73	0.45	274.97	74.44	19 31.2	20 7.7
	14	0.975	15.44	18.31	0.39	274.14	56.64	20 44.1	21 20.5
	16	0.979	15.60	16.84	0.33	273.17	38.88	21 56.9	22 33.2
	18	0.982	15.74	15.33	0.28	272.01	21.17	23 9.4	23 45.6
	20	0.986	15.87	13.78	0.23	270.63	3.50	. . . . .	0 21.8
	22	0.989	15.98	12.20	0.18	268.93	345.87	0 57.9	1 34.0
	24	0.991	16.07	10.59	0.14	266.76	328.28	2 10.1	2 46.1
	26	0.994	16.14	8.97	0.10	263.90	310.71	3 22.1	3 58.1
	28	0.996	16.19	7.35	0.07	259.89	293.16	4 34.0	5 9.9
	30	0.998	16.22	5.75	0.04	253.82	275.64	5 45.8	6 21.7
	32	0.999	16.23	4.24	0.02	243.49	258.13	6 57.6	7 33.5

APPARENT ORBITS OF THE SATELLITES OF MARS, AT DATE OF OPPOSITION,
JANUARY 5, 1914, AS SEEN IN AN INVERTING TELESCOPE.

South



North

Phobos.			Deimos.		
Date.	Position Angle of Apsis.	Distance at Apsis.	Date.	Position Angle of Apsis.	Distance at Apsis.
d Nov. 22	° 256.7	" 17.0	d Nov. 22	° 256.7	" 42.7
Dec. 12	255.8	19.6	Dec. 12	255.8	49.2
32	251.9	20.8	32	251.9	52.2

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

Phobos.			Deimos.		
d Nov. 11 22.4 E.	d Nov. 28 16.2 W.	d Dec. 15 10.1 E.	d Nov. 8 15.2 E.	d Dec. 7 1.0 W.	
13 1.2 W.	29 19.0 E.	16 12.8 W.	10 12.6 W.	8 22.4 E.	
14 4.0 E.	30 21.8 W.	17 15.6 E.	12 10.1 E.	10 19.8 W.	
15 6.8 W.	Dec. 2 0.6 E.	18 18.4 W.	14 7.5 W.	12 17.2 E.	
16 9.6 E.	3 3.4 W.	19 21.1 E.	16 5.0 E.	14 14.7 W.	
17 12.4 W.	4 6.2 E.	20 23.9 W.	18 2.5 W.	16 12.0 E.	
18 15.1 E.	5 8.9 W.	22 2.7 E.	20 0.0 E.	18 9.5 W.	
19 17.9 W.	6 11.7 E.	23 5.4 W.	21 21.4 W.	20 6.9 E.	
20 20.7 E.	7 14.5 W.	24 8.2 E.	23 18.9 E.	22 4.3 W.	
21 23.5 W.	8 17.3 E.	25 11.0 W.	25 16.3 W.	24 1.7 E.	
23 2.3 E.	9 20.1 W.	26 13.8 E.	27 13.8 E.	25 23.1 W.	
24 5.1 W.	10 22.9 E.	27 16.6 W.	29 11.2 W.	27 20.4 E.	
25 7.8 E.	12 1.7 W.	28 19.4 E.	Dec. 1 8.7 E.	29 17.9 W.	
26 10.6 W.	13 4.5 E.	29 22.2 W.	3 6.1 W.	31 15.2 E.	
27 13.4 E.	14 7.3 W.	31 0.9 E.	5 3.5 E.	33 12.7 W.	

For Phobos every seventh eastern and western elongation is given, and for Deimos every third; the intermediate ones may be found by adding multiples of the period of the satellite.

Sidereal period of Phobos, 7^h 39^m 13^s.85. Sidereal period of Deimos, 30^h 17^m 54^s.86.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.

WASHINGTON MEAN TIME.

Noon.		Light-Time.	Stellar Magnitude.	<i>P</i>	$A_{\oplus} + 180^{\circ}$	D_{\oplus}	$A_{\odot} + 180^{\circ}$	D_{\odot}
		m		°	°	°	°	°
Jan.	25	50.51	-1.4	356.78	139.46	-2.09	134.06	-2.21
Feb.	1	49.98	1.4	356.10	140.93	2.05	134.63	2.18
	8	49.38	1.5	355.44	142.35	2.02	135.20	2.16
	15	48.72	1.5	354.82	143.72	1.98	135.78	2.14
	22	48.00	1.5	354.23	145.02	1.94	136.35	2.12
Mar.	1	47.22	-1.5	353.68	146.23	-1.91	136.92	-2.10
	8	46.39	1.6	353.17	147.36	1.87	137.50	2.08
	15	45.52	1.6	352.70	148.40	1.84	138.07	2.05
	22	44.62	1.7	352.28	149.34	1.81	138.64	2.03
	29	43.70	1.7	351.92	150.16	1.78	139.22	2.00
Apr.	5	42.77	-1.8	351.62	150.85	-1.75	139.80	-1.98
	12	41.84	1.8	351.37	151.41	1.72	140.37	1.96
	19	40.91	1.9	351.19	151.83	1.70	140.95	1.94
	26	40.00	1.9	351.07	152.10	1.68	141.53	1.91
May	3	39.13	2.0	351.01	152.22	1.66	142.10	1.89
	10	38.31	-2.0	351.02	152.19	-1.65	142.68	-1.86
	17	37.54	2.1	351.10	152.01	1.64	143.26	1.84
	24	36.84	2.1	351.25	151.68	1.64	143.84	1.81
	31	36.22	2.2	351.46	151.20	1.63	144.42	1.79
June	7	35.70	2.2	351.72	150.59	1.63	145.00	1.76
	14	35.28	-2.2	352.03	149.88	-1.63	145.59	-1.74
	21	34.96	2.2	352.39	149.08	1.63	146.17	1.71
	28	34.76	2.2	352.77	148.22	1.64	146.75	1.68
	5	34.69	2.2	353.17	147.32	1.64	147.34	1.66
July	12	34.73	2.2	353.57	146.42	1.64	147.92	1.63
	19	34.89	-2.2	353.96	145.56	-1.64	148.50	-1.60
	26	35.16	2.2	354.33	144.76	1.64	149.09	1.58
	2	35.54	2.2	354.66	144.04	1.65	149.67	1.55
	9	36.03	2.2	354.94	143.43	1.64	150.26	1.52
Aug.	16	36.61	2.1	355.16	142.95	1.64	150.84	1.50
	23	37.27	-2.1	355.31	142.61	-1.64	151.43	-1.47
	30	38.00	2.1	355.40	142.42	1.63	152.02	1.44
	6	38.79	2.0	355.41	142.39	1.62	152.61	1.41
	13	39.62	2.0	355.35	142.51	1.61	153.19	1.39
Sept.	20	40.49	1.9	355.22	142.79	1.59	153.78	1.36
	27	41.37	-1.9	355.02	143.22	-1.58	154.37	-1.33
	4	42.26	1.8	354.76	143.79	1.56	154.96	1.30
	11	43.15	1.8	354.44	144.50	1.53	155.56	1.27
	18	44.02	1.8	354.06	145.33	1.51	156.15	1.24
Oct.	25	44.88	1.7	353.63	146.28	1.48	156.74	1.21
	1	45.71	-1.7	353.16	147.34	-1.45	157.33	-1.18
	8	46.49	1.6	352.64	148.49	1.42	157.92	1.15
	15	47.22	1.6	352.08	149.73	1.38	158.52	1.12
	22	47.90	1.6	351.50	151.05	1.34	159.11	1.09
Nov.	29	48.53	1.5	350.89	152.45	1.30	159.71	1.06
	6	49.08	-1.5	350.26	153.90	-1.26	160.30	-1.03
	13	49.55	-1.5	349.62	155.41	-1.21	160.90	-1.00

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER.
WASHINGTON MEAN TIME.

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER, EQUATORIAL REGION.

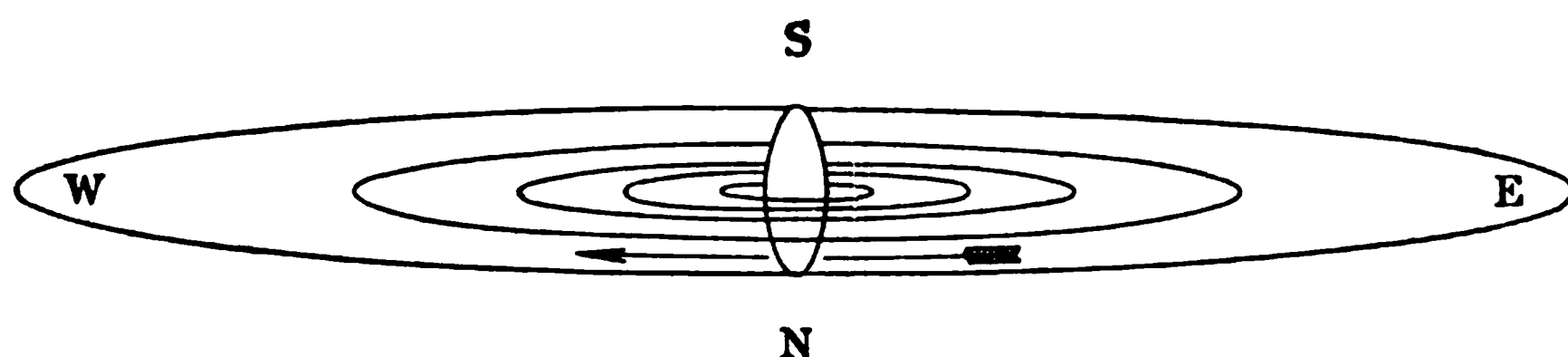
WASHINGTON MEAN TIME.

Transit of Zero Meridian.				Interval between Successive Transits.	Transit of Zero Meridian.				Interval between Successive Transits.	Transit of Zero Meridian.				Interval between Successive Transits.		
d h m				h m	d h m				h m	d h m				h m		
Jan.	26	19	35.96	9 50.61	May	13	10	33.29	9 50.44	Aug.	28	1	8.55	9 50.53		
	28	20	49.00			15	11	45.50			30	2	21.23			
	30	22	2.02			17	12	57.69		Sept.	1	3	33.94			
Feb.	1	23	15.03	9 50.59		19	14	9.87	9 50.43		3	4	46.67	9 50.56		
	4	0	28.03			21	15	22.04			5	5	59.43			
	6	1	41.01			23	16	34.19			7	7	12.22			
	8	2	53.98	9 50.58	June	25	17	46.33	9 50.42		9	8	25.03	9 50.58		
	10	4	6.93			27	18	58.45			11	9	37.86			
	12	5	19.87			29	20	10.57			13	10	50.72			
	14	6	32.79	9 50.56		31	21	22.67	9 50.41		15	12	3.60	9 50.60		
Mar.	16	7	45.70	9 50.55	July	2	22	34.77	9 50.41	Oct.	17	13	16.51		9 50.62	
	18	8	58.59			4	23	46.85			19	14	29.43			
	20	10	11.47			7	0	58.92			21	15	42.37			
	22	11	24.34			9	2	10.99			23	16	55.34			
	24	12	37.19			11	3	23.05			25	18	8.32			
	26	13	50.02	9 50.53		13	4	35.10	9 50.43		27	19	21.33	9 50.64		
	28	15	2.84		15	5	47.15	Nov.	29	20	34.34	9 50.65				
2	16	15.64	17		6	59.20	9 50.45		1	21	47.38					
4	17	28.43	19		8	11.24	Dec.		3	23	0.44					
6	18	41.20	21		9	23.28			6	0	13.51	9 50.66				
	8	19	53.95		9 50.52				23	10	35.32		9 50.47		8	1	26.60	9 50.67
	10	21	6.69	Aug.	25	11		47.36	9 50.41		10		2	39.71	9 50.67	
	12	22	19.41		27	12		59.41	9 50.43		12	3	52.84			
	14	23	32.12		29	14	11.45	9 50.45		14	5	5.98				
	17	0	44.81		9 50.48		1	15	23.50	9 50.43		16	6	19.13	9 50.67	
Apr.	19	1	57.49		9 50.46		3	16	35.56	9 50.41		18	7	32.30		9 50.66
	21	3	10.15		5	17	47.63	9 50.43		20	8	45.48				
	23	4	22.79		7	18	59.71	9 50.45		22	9	58.67				
	25	5	35.41		9	20	11.80	9 50.43		24	11	11.88				
	27	6	48.01		11	21	23.91	9 50.47		26	12	25.10				
	29	8	0.60		13	22	36.03	9 50.41		28	13	38.32				
31	9	13.17	15		23	48.17	9 50.43		30	14	51.56					
2	10	25.72	18		1	0.32	9 50.45		1	16	4.81					
4	11	38.26	20		2	12.50	9 50.47		3	17	18.06					
6	12	50.78	22		3	24.70	9 50.50		5	18	31.32					
	8	14	3.28		24	4	36.91	9 50.52		7	19	44.58				
	10	15	15.76		26	5	49.15	9 50.50		9	20	57.86				
	12	16	28.23		28	7	1.42	9 50.52		11	22	11.14				
	14	17	40.68		30	8	13.71	9 50.54		13	23	24.43				
	16	18	53.12		9 50.45		1	9	26.03	9 50.47		16	0	37.73		
	18	20	5.54		3	10	38.37	9 50.49		18	1	51.04				
	20	21	17.94		5	11	50.74	9 50.51		20	3	4.35				
	22	22	30.33		7	13	3.14	9 50.53		22	4	17.67				
	24	23	42.69		9	14	15.56	9 50.55		24	5	31.00				
	27	0	55.05		11	15	28.01	9 50.57		26	6	44.32				
May	29	2	7.38		13	16	40.48	9 50.59		28	7	57.66	9 50.67			
	1	3	19.70		15	17	52.99	9 50.61		30	9	10.99				
	3	4	32.00		17	19	5.52	9 50.63		2	10	24.33				
	5	5	44.29		19	20	18.07	9 50.65		4	11	37.66				
	7	6	56.56		21	21	30.65	9 50.67		6	12	51.00				
	9	8	8.82		23	22	43.26	9 50.69		8	14	4.33	9 50.67			
	11	9	21.06		25	23	55.89	9 50.71		10	15	17.67				

EPHEMERIS FOR PHYSICAL OBSERVATIONS OF JUPITER, GREAT RED SPOT.

WASHINGTON MEAN TIME.

Transit of Great Red Spot.				Interval between Successive Transits.	Transit of Great Red Spot.				Interval between Successive Transits.	Transit of Great Red Spot.				Interval between Successive Transits.	
d h m				h m	d h m				h m	d h m				h m	
Jan.	25	5	35.26	9 55.78	May	12	18	58.09	9 55.62	Aug.	28	7	57.95	9 55.71	
	27	7	14.18			14	20	36.17			30	9	36.51		
	29	8	53.08			16	22	14.23			Sept.	1	11		15.09
	31	10	31.97			18	23	52.28				3	12		53.70
Feb.	2	12	10.85	9 55.77		21	1	30.31	9 55.60		5	14	32.34	9 55.73	
	4	13	49.71			23	3	8.32			7	16	11.00		
	6	15	28.56			25	4	46.31			9	17	49.68		
	8	17	7.40			27	6	24.29			11	19	28.38		
	10	18	46.23	9 55.76	June	29	8	2.26	9 55.59		13	21	7.11	9 55.76	
	12	20	25.05			31	9	40.22			15	22	45.86		
	14	22	3.85			2	11	18.17			18	0	24.63		
	16	23	42.63			4	12	56.11			20	2	3.43		
	19	1	21.38	9 55.74		6	14	34.04	9 55.58	Oct.	22	3	42.25	9 55.78	
	21	3	0.12			8	16	11.96			24	5	21.08		
	23	4	38.83			10	17	49.88			26	6	59.93		
	25	6	17.53			12	19	27.80			28	8	38.81		
Mar.	27	7	56.23	9 55.72		14	21	5.71	9 55.58		30	10	17.70	9 55.80	
	1	9	34.92			16	22	43.61			2	11	56.61		
	3	11	13.59			19	0	21.51			4	13	35.55		
	5	12	52.24			21	1	59.40			6	15	14.50		
	7	14	30.88	9 55.71	July	23	3	37.29	9 55.60		8	16	53.47	9 55.81	
	9	16	9.49			25	5	15.19			10	18	32.45		
	11	17	48.08			27	6	53.09			12	20	11.44		
	13	19	26.66			29	8	30.99			14	21	50.45		
	15	21	5.23	9 55.69		1	10	8.89	9 55.62		16	23	29.47	9 55.82	
	17	22	43.79			3	11	46.80			19	1	8.52		
	20	0	22.33			5	13	24.72			21	2	47.58		
	22	2	0.85			7	15	2.65			23	4	26.66		
	24	3	39.35	9 55.67		9	16	40.60	9 55.60		25	6	5.74	9 55.83	
	26	5	17.83			11	18	18.56			27	7	44.83		
	28	6	56.29			13	19	56.53			29	9	23.93		
	30	8	34.73			15	21	34.52			31	11	3.04		
Apr.	1	10	13.15	9 55.66	Aug.	17	23	12.53	9 55.64		2	12	42.16	9 55.84	
	3	11	51.56			20	0	50.56			4	14	21.29		
	5	13	29.95			22	2	28.61			6	16	0.43		
	7	15	8.33			24	4	6.69			8	17	39.58		
	9	16	46.69	9 55.64		26	5	44.80	9 55.67		10	19	18.74	9 55.84	
	11	18	25.03			28	7	22.93			12	20	57.91		
	13	20	3.36			30	9	1.08			14	22	37.07		
	15	21	41.67			1	10	39.25			17	0	16.24		
	17	23	19.96	9 55.62		3	12	17.44	9 55.70		19	1	55.42	9 55.84	
	20	0	58.23			5	13	55.66			21	3	34.61		
	22	2	36.48			7	15	33.91			23	5	13.81		
	24	4	14.72			9	17	12.20			25	6	53.01		
	26	5	52.94	9 55.64		11	18	50.51	9 55.70		27	8	32.22	9 55.84	
	28	7	31.14			13	20	28.85			29	10	11.42		
	30	9	9.32			15	22	7.22			1	11	50.63		
	2	10	47.49			17	23	45.61			3	13	29.85		
May	4	12	25.64	9 55.62		20	1	24.02	9 55.70		5	15	9.06	9 55.84	
	6	14	3.78			22	3	2.47			7	16	48.28		
	8	15	41.90			24	4	40.94			9	18	27.50		
	10	17	20.00			26	6	19.43			11	20	6.71		



APPARENT ORBITS OF THE SATELLITES OF JUPITER AT DATE OF OPPOSITION, JULY 4, 1913, AS SEEN IN AN INVERTING TELESCOPE.

(The vertical scale is three times the horizontal one.)

In the above diagram the central vertical ellipse represents the disk of Jupiter, elongated three times in the vertical direction, and the inner ellipse represents the orbit of Satellite V. The object of the figure is to facilitate the identification of satellites in cases where the diagrams of configurations do not suffice. For example, if two satellites are seen together, a reference to the above figure will show which is the inner and which the outer one of the pair.

The ephemeris of the four outer satellites of Jupiter is given on pages 632–655, each month occupying two pages, which contain, respectively, the times of the phenomena and the diagrams of the configurations. The latter are given for each day, Jupiter being represented by a light disk, ○, in the center of the page, and the relative positions of the satellites at the Washington time stated above the diagrams being indicated by dots. The designation of each satellite is shown by a numeral placed to the right or left of the dot, according as the motion of the satellite at the instant in question is toward the east or toward the west, the motion being always toward the numeral. In constructing the diagrams the latitudes of the satellites are always considered zero, except where two or more of them chance to be at nearly the same distance from the planet, when they are placed one above the other, according to their apparent latitudes. If, at the epoch of any configuration, one or more satellites are projected on the disk of the planet, that phenomenon is indicated by a light disk ○, at the left-hand side of the page; and if any satellites are invisible on account of being occulted behind the disk of the planet, or eclipsed by its shadow, that circumstance is indicated by a dark disk, ●, at the right-hand side of the page. In both cases the annexed numerals serve to point out which satellites are thus rendered invisible.

The differential coordinates of the sixth and seventh satellites will be found on pages 630 and 631.

MEAN SYNODIC PERIODS OF THE SATELLITES.

I.	d	h	m	s	=	d		V.	d	h	m	s	=	d
	1	18	28	35.945		1.769	860 48		0	11	57	27.635		0.498 236 52
II.	3	13	17	53.735	=	3.554	094 16	VI.					=	266.00
III.	7	3	59	35.854	=	7.166	387 20	VII.					=	276.67
IV.	16	18	5	6.928	=	16.753	552 41							

[Eph 13]

SATELLITE V.

WASHINGTON MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

Apr.	d	h	E.	July	d	h	E.	Apr.	d	h	W.	July	d	h	W.
	20	12.4	E.		19	16.2	E.		20	6.4	W.		19	10.2	W.
	30	11.5	E.		29	15.3	E.		30	17.5	W.		29	9.3	W.
May	10	10.6	E.	Aug.	8	14.4	E.	May	10	16.6	W.	Aug.	8	8.4	W.
	20	9.7	E.		18	13.5	E.		20	15.7	W.		18	7.5	W.
	30	8.8	E.		28	12.6	E.		30	14.8	W.		28	6.6	W.
June	9	7.9	E.	Sept.	7	11.8	E.	June	9	13.9	W.	Sept.	7	17.7	W.
	19	7.0	E.		17	10.9	E.		19	12.9	W.		17	16.9	W.
	29	6.1	E.		27	10.1	E.		29	12.0	W.		27	16.1	W.
July	9	17.1	E.	Oct.	7	9.3	E.	July	9	11.1	W.	Oct.	7	15.2	W.

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE I.

Jan.	d	h	m	Apr.	d	h	m	July	d	h	m	Sept.	d	h	m
	18	12	28.9		13	12	1.3		7	9	27.1		30	7	9.5
	20	6	59.1		15	6	29.5		9	3	53.1	Oct.	2	1	38.3
	22	1	29.3		17	0	57.6		10	22	19.0		3	20	7.1
	23	19	59.5		18	19	25.7		12	16	45.0		5	14	36.0
	25	14	29.7		20	13	53.7		14	11	11.0		7	9	4.9
	27	8	59.9		22	8	21.7		16	5	37.0		9	3	33.9
	29	3	30.0		24	2	49.6		18	0	3.1		10	22	3.0
	30	22	0.1		25	21	17.3		19	18	29.2		12	16	32.1
Feb.	1	16	30.2		27	15	45.0		21	12	55.3		14	11	1.2
	3	11	0.3		29	10	12.7		23	7	21.5		16	5	30.4
	5	5	30.4	May	1	4	40.3		25	1	47.7		17	23	59.7
	7	0	0.3		2	23	7.8		26	20	13.9		19	18	29.0
	8	18	30.3		4	17	35.3		28	14	40.2		21	12	58.4
	10	13	0.2		6	12	2.7		30	9	6.5		23	7	27.8
	12	7	30.1		8	6	30.0	Aug.	1	3	32.9		25	1	57.2
	14	2	0.0		10	0	57.2		2	21	59.4		26	20	26.8
	15	20	29.9		11	19	24.4		4	16	25.9		28	14	56.4
	17	14	59.7		13	13	51.5		6	10	52.5		30	9	26.0
	19	9	29.4		15	8	18.6		8	5	19.1	Nov.	1	3	55.6
	21	3	59.1		17	2	45.5		9	23	45.8		2	22	25.3
	22	22	28.8		18	21	12.4		11	18	12.5		4	16	55.0
	24	16	58.5		20	15	39.3		13	12	39.3		6	11	24.8
	26	11	28.1		22	10	6.1		15	7	6.1		8	5	54.6
	28	5	57.7		24	4	32.8		17	1	33.1		10	0	24.5
Mar.	2	0	27.3		25	22	59.5		18	20	0.1		11	18	54.4
	3	18	56.8		27	17	26.1		20	14	27.2		13	13	24.3
	5	13	26.2		29	11	52.6		22	8	54.3		15	7	54.3
	7	7	55.6		31	6	19.1		24	3	21.5		17	2	24.3
	9	2	25.0	June	2	0	45.5		25	21	48.8		18	20	54.3
	10	20	54.3		3	19	11.9		27	16	16.2		20	15	24.4
	12	15	23.6		5	13	38.3		29	10	43.6		22	9	54.4
	14	9	52.8		7	8	4.6		31	5	11.1		24	4	24.5
	16	4	22.0		9	2	30.9	Sept.	1	23	38.7		25	22	54.6
	17	22	51.1		10	20	57.1		3	18	6.3		27	17	24.8
	19	17	20.2		12	15	23.3		5	12	34.0		29	11	55.0
	21	11	49.2		14	9	49.4		7	7	1.8	Dec.	1	6	25.2
	23	6	18.2		16	4	15.5		9	1	29.7		3	0	55.4
	25	0	47.1		17	22	41.6		10	19	57.6		4	19	25.6
	26	19	15.9		19	17	7.6		12	14	25.6		6	13	55.9
	28	13	44.7		21	11	33.6		14	8	53.7		8	8	26.2
	30	8	13.4		23	5	59.6		16	3	21.9		10	2	56.5
Apr	1	2	42.1		25	0	25.6		17	21	50.1		11	21	26.8
	2	21	10.7		26	18	51.5		19	16	18.4		13	15	57.2
	4	15	39.3		28	13	17.5		21	10	46.7		15	10	27.6
	6	10	7.8		30	7	43.5		23	5	15.1		17	4	58.0
	8	4	36.3	July	2	2	9.4		24	23	43.6		18	23	28.4
	9	23	4.7		3	20	35.3		26	18	12.1				
	11	17	33.0		5	15	1.2		28	12	40.8				

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

SATELLITE II.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	19	5	32.2	Apr.	14	13	43.0	July	8	17	51.7	Oct.	1	22	50.4
	22	18	55.9		18	2	58.5		12	6	58.7		5	12	9.3
	26	8	19.4		21	16	13.6		15	20	6.5		9	1	29.8
	29	21	42.8		25	5	28.1		19	9	14.0		12	14	49.8
Feb.	2	11	5.9		28	18	42.1		22	22	22.4		16	4	11.3
	6	0	28.7	May	2	7	55.6		26	11	30.5		19	17	32.1
	9	13	51.4		5	21	8.6		30	0	39.6		23	6	54.4
	13	3	13.8		9	10	21.1	Aug.	2	13	48.4		26	20	16.0
	16	16	35.9		12	23	33.0		6	2	58.4		30	9	39.2
	20	5	57.7		16	12	44.4		9	16	8.1	Nov.	2	23	1.6
	23	19	19.3		20	1	55.3		13	5	19.1		6	12	25.4
	27	8	40.6		23	15	5.8		16	18	29.8		10	1	48.5
Mar.	2	22	1.5		27	4	15.8		20	7	42.0		13	15	13.0
	6	11	22.0		30	17	25.4		23	20	53.9		17	4	36.7
	10	0	42.3	June	3	6	34.6		27	10	7.3		20	18	1.7
	13	14	2.2		6	19	43.3		30	23	20.4		24	7	25.8
	17	3	21.8		10	8	51.8	Sept.	3	12	35.1		27	20	51.3
	20	16	40.9		13	21	59.7		7	1	49.5	Dec.	1	10	15.9
	24	5	59.7		17	11	7.6		10	15	5.4		4	23	41.7
	27	19	18.1		21	0	15.0		14	4	20.9		8	13	6.6
	31	8	36.0		24	13	22.5		17	17	38.1		12	2	32.7
Apr.	3	21	53.5		28	2	29.6		21	6	54.8		15	15	57.9
	7	11	10.4	July	1	15	37.1		24	20	13.1		19	5	24.1
	11	0	27.0		5	4	44.1		28	9	30.9				

SATELLITE III.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	18	20	29.6	Apr.	14	23	18.9	July	9	17	23.4	Oct.	3	12	35.1
	26	0	55.8		22	3	11.1		16	20	40.6		10	16	38.6
Feb.	2	5	20.7		29	6	58.8		23	23	59.8		17	20	46.5
	9	9	44.5	May	6	10	41.6		31	3	20.8		25	0	57.6
	16	14	6.2		13	14	20.0	Aug.	7	6	44.7	Nov.	1	5	12.3
	23	18	26.3		20	17	54.6		14	10	12.6		8	9	29.2
Mar.	2	22	43.3		27	21	24.6		21	13	44.7		15	13	48.7
	10	2	57.5	June	4	0	51.1		28	17	22.0		22	18	10.6
	17	7	8.5		11	4	13.6	Sept.	4	21	3.5		29	22	34.5
	24	11	16.3		18	7	33.2		12	0	49.1	Dec.	7	3	0.8
	31	15	21.1		25	10	50.6		19	4	40.7		14	7	28.3
Apr.	7	19	21.7	July	2	14	6.8		26	8	35.7				

SATELLITE IV.

	d	h	m		d	h	m		d	h	m		d	h	m
Jan.	26	18	57.7	Apr.	20	18	43.1	July	12	23	9.2	Oct.	4	7	14.8
Feb.	12	15	14.0	May	7	11	33.8		29	13	35.1		21	1	55.1
Mar.	1	11	4.6		24	3	27.4	Aug.	15	4	38.4	Nov.	6	21	18.3
	18	6	22.2	June	9	18	29.8		31	20	32.6		23	17	16.0
Apr.	4	0	57.4		26	8	56.6	Sept.	17	13	25.2	Dec.	10	13	38.8

DIFFERENTIAL COORDINATES OF SATELLITE VI.

Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VI}-\alpha_{Jup.}$		$\delta_{VI}-\delta_{Jup.}$
	m	s	'		m	s	'		m	s	'
Feb. 15	-2	32	+11.3	May 20	+4	20	-12.1	Aug. 22	-2	37	-21.6
17	2	26	12.1	22	4	20	13.3	24	2	45	20.5
19	2	20	12.9	24	4	20	14.6	26	2	52	19.3
21	2	14	13.6	26	4	20	15.8	28	2	59	18.1
23	2	7	14.3	28	4	19	17.1	30	3	6	16.9
25	-2	0	+14.9	30	+4	18	-18.3	Sept. 1	-3	12	-15.7
27	1	52	15.4	June 1	4	16	19.5	3	3	18	14.5
Mar. 1	1	44	15.8	3	4	13	20.6	5	3	23	13.3
3	1	36	16.2	5	4	9	21.7	7	3	27	12.1
5	1	27	16.5	7	4	5	22.8	9	3	31	10.9
7	-1	17	+16.8	9	+4	0	-23.9	11	-3	35	- 9.7
9	1	7	17.0	11	3	54	25.0	13	3	38	8.5
11	0	57	17.1	13	3	48	26.0	15	3	41	7.4
13	0	46	17.1	15	3	41	27.0	17	3	43	6.2
15	0	35	17.1	17	3	34	27.9	19	3	44	5.0
17	-0	24	+17.0	19	+3	26	-28.8	21	-3	45	- 3.8
19	-0	12	16.9	21	3	18	29.6	23	3	45	2.6
21	0	0	16.7	23	3	9	30.4	25	3	45	1.4
23	+0	12	16.5	25	2	59	31.1	27	3	45	- 0.3
25	0	24	16.2	27	2	49	31.8	29	3	44	+ 0.8
27	+0	37	+15.8	29	+2	38	-32.4	Oct. 1	-3	42	+ 1.9
29	0	49	15.3	July 1	2	27	32.9	3	3	40	3.0
31	1	1	14.8	3	2	16	33.4	5	3	37	4.0
Apr. 2	1	13	14.2	5	2	4	33.8	7	3	34	5.1
4	1	25	13.6	7	1	52	34.1	9	3	31	6.1
6	+1	37	+12.9	9	+1	40	-34.3	11	-3	27	+ 7.1
8	1	49	12.1	11	1	28	34.4	13	3	23	8.0
10	2	0	11.2	13	1	15	34.5	15	3	18	8.9
12	2	11	10.3	15	1	2	34.5	17	3	13	9.7
14	2	22	9.4	17	0	49	34.5	19	3	7	10.5
16	+2	32	+ 8.4	19	+0	36	-34.4	21	-3	1	+11.3
18	2	42	7.3	21	0	23	34.1	23	2	54	12.0
20	2	52	6.2	23	+0	10	33.8	25	2	47	12.7
22	3	1	5.1	25	-0	3	33.4	27	2	40	13.3
24	3	10	4.0	27	0	16	32.9	29	2	32	13.9
26	+3	18	+ 2.9	29	-0	28	-32.3	31	-2	24	+14.4
28	3	26	1.7	31	0	41	31.7	Nov. 2	2	16	14.9
30	3	34	+ 0.5	Aug. 2	0	53	31.0	4	2	8	15.3
May 2	3	41	- 0.8	4	1	5	30.3	6	1	59	15.7
4	3	48	2.0	6	1	17	29.5	8	1	50	16.0
6	+3	54	- 3.3	8	-1	28	-28.7	10	-1	40	+16.2
8	3	59	4.5	10	1	39	27.9	12	1	30	16.4
10	4	4	5.8	12	1	50	27.0	14	1	20	16.5
12	4	8	7.0	14	2	0	26.0	16	1	10	16.5
14	4	12	8.3	16	2	10	25.0	18	-1	0	+16.5
16	+4	15	- 9.6	18	-2	19	-23.9				
18	+4	18	-10.8	20	-2	28	-22.8				

DIFFERENTIAL COORDINATES OF SATELLITE VII.

Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$	Washington Mean Noon.	$\alpha_{VII}-\alpha_{Jup.}$		$\delta_{VII}-\delta_{Jup.}$
	m	s	'		m	s	'		m	s	'
eb. 15	-2	0	-17.8	May 20	-0	24	+25.9	Aug. 22	+4	13	+20.0
17	2	7	17.7	22	0	15	27.0	24	4	8	18.6
19	2	13	17.6	24	-0	5	28.1	26	4	2	17.2
21	2	19	17.4	26	+0	5	29.2	28	3	56	15.7
23	2	25	17.1	28	0	15	30.3	30	3	49	14.2
25	-2	30	-16.7	30	+0	26	+31.3	Sept. 1	+3	42	+12.7
27	2	35	16.3	June 1	0	36	32.3	3	3	34	11.1
ar. 1	2	39	15.8	3	0	47	33.2	5	3	26	9.6
3	2	43	15.3	5	0	58	34.1	7	3	17	8.0
5	2	46	14.7	7	1	9	34.9	9	3	7	6.5
7	-2	49	-14.1	9	+1	20	+35.7	11	+2	57	+ 4.9
9	2	51	13.4	11	1	31	36.4	13	2	47	3.3
11	2	53	12.6	13	1	42	37.0	15	2	36	1.7
13	2	55	11.8	15	1	53	37.6	17	2	25	+ 0.1
15	2	56	10.9	17	2	4	38.1	19	2	13	- 1.4
17	-2	57	-10.0	19	+2	14	+38.6	21	+2	1	- 2.9
19	2	57	9.1	21	2	24	39.0	23	1	49	4.3
21	2	57	8.2	23	2	34	39.3	25	1	37	5.7
23	2	56	7.2	25	2	44	39.5	27	1	24	7.1
25	2	55	6.2	27	2	54	39.7	29	1	12	8.4
27	-2	54	- 5.2	29	+3	3	+39.8	Oct. 1	+0	59	- 9.7
29	2	52	4.2	July 1	3	12	39.8	3	0	47	10.9
31	2	50	3.1	3	3	21	39.7	5	0	34	12.0
pr. 2	2	48	2.0	5	3	29	39.6	7	0	21	13.0
4	2	45	- 0.8	7	3	37	39.4	9	+0	9	14.0
6	-2	42	+ 0.3	9	+3	44	+39.2	11	-0	3	-14.9
8	2	39	1.5	11	3	51	38.9	13	0	15	15.7
10	2	36	2.6	13	3	57	38.5	15	0	27	16.4
12	2	32	3.7	15	4	3	38.0	17	0	38	17.1
14	2	28	4.8	17	4	8	37.5	19	0	49	17.6
16	-2	24	+ 6.0	19	+4	13	+37.0	21	-0	59	-18.1
18	2	19	7.1	21	4	18	36.4	23	1	9	18.5
20	2	14	8.3	23	4	22	35.8	25	1	19	18.7
22	2	9	9.4	25	4	26	35.1	27	1	29	18.9
24	2	3	10.6	27	4	29	34.3	29	1	38	19.0
26	-1	57	+11.7	29	+4	31	+33.5	31	-1	47	-19.0
28	1	51	12.9	31	4	33	32.7	Nov. 2	1	55	18.9
30	1	44	14.0	Aug. 2	4	34	31.8	4	2	2	18.7
ly 2	1	37	15.2	4	4	34	30.8	6	2	9	18.5
4	1	30	16.4	6	4	34	29.8	8	2	15	18.2
6	-1	23	+17.6	8	+4	33	+28.7	10	-2	21	-17.8
8	1	16	18.8	10	4	32	27.6	12	2	26	17.3
10	1	8	20.0	12	4	30	26.4	14	2	30	16.7
12	1	0	21.2	14	4	28	25.2	16	2	33	16.0
14	0	51	22.4	16	4	25	24.0	18	-2	36	-15.3
16	-0	42	+23.6	18	+4	22	+22.7				
18	-0	33	+24.7	20	+4	18	+21.4				

WASHINGTON MEAN TIME.

JANUARY.

By reason of the proximity of JUPITER to the SUN the phenomena of the satellites are not given prior to January 17.

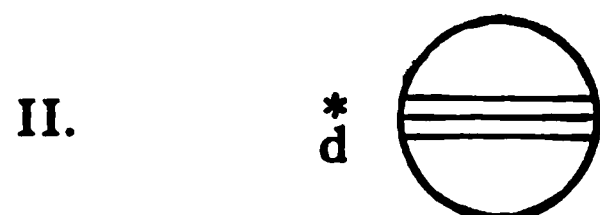
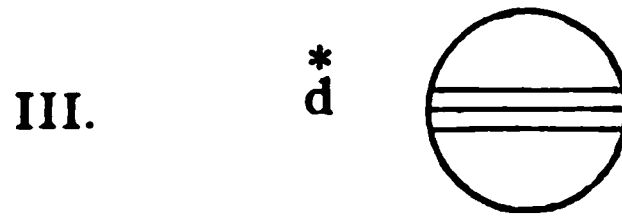
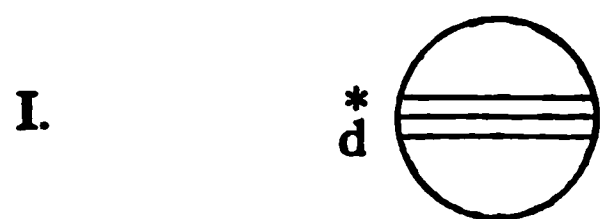
d	h	m	s				d	h	m	s				d	h	m	s					
17	13	39			I.	Sh.	In.	22	16	24	49		II.	Ec.	Dis.	28	2	45		II.	Sh.	Eg.
	14	10			I.	Tr.	In.		20	19			II.	Oc.	Re.		4	9		II.	Tr.	Eg.
	15	55			I.	Sh.	Eg.		21	4			I.	Sh.	In.		4	29		I.	Sh.	In.
	16	27			I.	Tr.	Eg.		21	40			I.	Tr.	In.		5	10		I.	Tr.	In.
18	10	51	0		I.	Ec.	Dis.		23	20			I.	Sh.	Eg.		6	45		I.	Sh.	Eg.
	13	37			I.	Oc.	Re.		23	57			I.	Tr.	Eg.		7	27		I.	Tr.	Eg.
	16	58	38		III.	Ec.	Dis.	23	18	16	30		I.*	Ec.	Dis.	29	1	42	3	I.	Ec.	Dis.
	21	58			III.	Oc.	Re.		21	8			I.	Oc.	Re.		4	38		I.	Oc.	Re.
19	3	7	48		II.	Ec.	Dis.	24	10	41			II.	Sh.	In.		10	45		III.	Sh.	In.
	6	55			II.	Oc.	Re.		11	57			II.	Tr.	In.		13	33		III.	Tr.	In.
	8	8			I.	Sh.	In.		13	26			II.	Sh.	Eg.		13	36		III.	Sh.	Eg.
	8	40			I.	Tr.	In.		14	44			II.	Tr.	Eg.		16	32		III.	Tr.	Eg.
	10	24			I.	Sh.	Eg.		15	33			I.	Sh.	In.		18	58	42	II.	Ec.	Dis.
	10	57			I.	Tr.	Eg.		16	10			I.	Tr.	In.		22	58		I.	Sh.	In.
20	5	19	27		I.	Ec.	Dis.		17	49			I.	Sh.	Eg.		23	6		II.	Oc.	Re.
	8	7			I.	Oc.	Re.		18	27			I.	Tr.	Eg.		23	40		I.	Tr.	In.
	21	23			II.	Sh.	In.	25	12	45	3		I.	Ec.	Dis.	30	1	14		I.	Sh.	Eg.
	22	32			II.	Tr.	In.		15	38			I.	Oc.	Re.		1	57		I.	Tr.	Eg.
21	0	8			II.	Sh.	Eg.		20	56	37		III.	Ec.	Dis.		20	10	31	I.	Ec.	Dis.
	1	19			II.	Tr.	Eg.	26	2	25			III.	Oc.	Re.		23	8		I.	Oc.	Re.
	2	36			I.	Sh.	In.		5	41	47		II.	Ec.	Dis.	31	13	17		II.	Sh.	In.
	3	10			I.	Tr.	In.		9	43			II.	Oc.	Re.		14	47		II.	Tr.	In.
	4	52			I.	Sh.	Eg.		10	1			I.	Sh.	In.		16	2		II.	Sh.	Eg.
	5	27			I.	Tr.	Eg.		10	40			I.	Tr.	In.		17	26		I.	Sh.	In.
	23	48	1		I.	Ec.	Dis.		12	17			I.	Sh.	Eg.		17	33		II.	Tr.	Eg.
22	2	38			I.	Oc.	Re.		12	57			I.	Tr.	Eg.		18	10		I.*	Tr.	In.
	6	46			III.	Sh.	In.	27	7	13	30		I.	Ec.	Dis.		19	42		I.	Sh.	Eg.
	9	8			III.	Tr.	In.		10	8			I.	Oc.	Re.		20	27		I.	Tr.	Eg.
	9	37			III.	Sh.	Eg.		23	59			II.	Sh.	In.							
	12	5			III.	Tr.	Eg.	28	1	23			II.	Tr.	In.							

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.
[Eph 13]

WASHINGTON MEAN TIME.

JANUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 18^h 15^m for an Inverting Telescope.

Day.	West.	East.
1		○
2		○
3		○
4		○
5		○
6		○
7		○
8		○
9		○
10		○
11		○
12		○
13		○
14		○
15		○
16		○
17	3	2° 1° ○ 4°
18	2 4°	1° ○ 3●
19	4° 1°	○ 2° 3°
20	4°	○ 2° 1° 3°
21	4° 2° 1°	○ 3°
22	4 3°	○ 1° 2●
23	4 3° 1°	○ 2°
24	○ 1° 4 3 2°	○
25	4 2 3	○ 1°
26	1°	○ 2° 3°
27		○ 2° 1° 4 3°
28	2° 1°	○ 3° 4°
29		○ 1° 4°
30	3° 1°	○ 2° 4°
31	○ 1° 3 2°	○ 4°

WASHINGTON MEAN TIME.

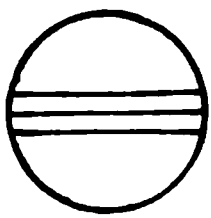
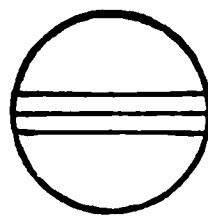
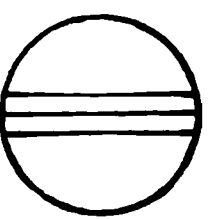
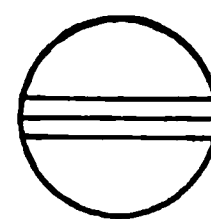
FEBRUARY.																							
d	h	m	s				d	h	m	s				d	h	m	s						
1	14	39	3	I.	Ec.	Dis.	11	5	12		II.	Sh.	In.	20	2	37		III.	Tr.	In.			
	17	39		I.*	Oc.	Re.		7	1		II.	Tr.	In.		2	39	29	II.	Ec.	Dis.			
2	0	54	39	III.	Ec.	Dis.		7	58		II.	Sh.	Eg.		4	38		I.	Sh.	In.			
	3	36	42	III.	Ec.	Re.		8	16		I.	Sh.	In.		5	38		I.	Tr.	In.			
	3	51		III.	Oc.	Dis.		9	9		I.	Tr.	In.		5	40		III.	Tr.	Eg.			
	6	51		III.	Oc.	Re.		9	47		II.	Tr.	Eg.		6	54		I.	Sh.	Eg.			
	8	15	36	II.	Ec.	Dis.		10	32		I.	Sh.	Eg.		7	21		II.	Oc.	Re.			
	11	55		I.	Sh.	In.		11	26		I.	Tr.	Eg.		7	54		I.	Tr.	Eg.			
	12	29		II.	Oc.	Re.	12	5	29	58	I.	Ec.	Dis.	21	0	7		IV.	Tr.	In.			
	12	40		I.	Tr.	In.		8	39		I.	Oc.	Re.		1	21		IV.	Tr.	Eg.			
	14	11		I.	Sh.	Eg.		14	39		IV.	Oc.	Dis.		1	52	16	I.	Ec.	Dis.			
	14	57		I.	Tr.	Eg.		15	49		IV.	Oc.	Re.		5	8		I.	Oc.	Re.			
3	9	7	29	I.	Ec.	Dis.		18	40		III.	Sh.	In.		21	6		II.	Sh.	In.			
	12	9		I.	Oc.	Re.		21	34		III.	Sh.	Eg.		23	6		I.	Sh.	In.			
4	2	36		II.	Sh.	In.		22	18		III.	Tr.	In.		23	11		II.	Tr.	In.			
	4	12		II.	Tr.	In.	13	0	6	1	II.	Ec.	Dis.		23	52		II.	Sh.	Eg.			
	5	21		II.	Sh.	Eg.		1	20		III.	Tr.	Eg.	22	0	7		I.	Tr.	In.			
	6	23		I.	Sh.	In.		2	44		I.	Sh.	In.		1	22		I.	Sh.	Eg.			
	6	59		II.	Tr.	Eg.		3	39		I.	Tr.	In.		1	58		II.	Tr.	Eg.			
	7	10		I.	Tr.	In.		4	37		II.	Oc.	Re.		2	24		I.	Tr.	Eg.			
	8	39		I.	Sh.	Eg.		5	1		I.	Sh.	Eg.		20	20	47	I.	Ec.	Dis.			
	9	27		I.	Tr.	Eg.		5	56		I.	Tr.	Eg.		23	37		I.	Oc.	Re.			
5	3	36	2	I.	Ec.	Dis.		23	58	24	I.	Ec.	Dis.	23	12	50	11	III.	Ec.	Dis.			
	6	39		I.	Oc.	Re.	14	3	8		I.	Oc.	Re.		15	35	56	III.	Ec.	Re.			
	14	42		III.	Sh.	In.		18	30		II.	Sh.	In.		15	56	11	II.	Ec.	Dis.			
	17	35		III.*	Sh.	Eg.		20	24		II.	Tr.	In.		16	54		III.*	Oc.	Dis.			
	17	56		III.*	Tr.	In.		21	13		I.	Sh.	In.		17	34		I.*	Sh.	In.			
	20	57		III.	Tr.	Eg.		21	15		II.	Sh.	Eg.		18	37		I	Tr.	In.			
	21	32	26	II.	Ec.	Dis.		22	9		I.	Tr.	In.		19	51		I.	Sh.	Eg.			
6	0	51		I.	Sh.	In.		23	11		II.	Tr.	Eg.		19	59		III.	Oc.	Re.			
	1	40		I.	Tr.	In.		23	29		I.	Sh.	Eg.		20	43		II.	Oc.	Re.			
	1	52		II.	Oc.	Re.	15	0	26		I.	Tr.	Eg.		20	54		I.	Tr.	Eg.			
	3	7		I.	Sh.	Eg.		18	26	55	I.	Ec.	Dis.	24	14	49	10	I.	Ec.	Dis.			
	3	57		I.	Tr.	Eg.		21	38		I.	Oc.	Re.		18	7		I.*	Oc.	Re.			
	22	4	29	I.	Ec.	Dis.	16	8	51	26	III.	Ec.	Dis.	25	10	25		II.	Sh.	In.			
7	1	9		I.	Oc.	Re.		11	35	58	III.	Ec.	Re.		12	3		I.	Sh.	In.			
	15	53		II.	Sh.	In.		12	35		III.	Oc.	Dis.		12	34		II.	Tr.	In.			
	17	36		II.*	Tr.	In.		13	22	46	II.	Ec.	Dis.		13	6		I.	Tr.	In.			
	18	39		II.	Sh.	Eg.		15	38		III.	Oc.	Re.		13	11		II.	Sh.	Eg.			
	19	19		I.	Sh.	In.		15	41		I.	Sh.	In.		14	19		I.	Sh.	Eg.			
	20	10		I.	Tr.	In.		16	38		I.	Tr.	In.		15	22		II.	Tr.	Eg.			
	20	23		II.	Tr.	Eg.		17	58		I.*	Sh.	Eg.		15	23		I.	Tr.	Eg.			
	21	36		I.	Sh.	Eg.		18	0		II.*	Oc.	Re.	26	9	17	41	I.	Ec.	Dis.			
	22	26		I.	Tr.	Eg.		18	55		I.	Tr.	Eg.		12	37		I.	Oc.	Re.			
8	16	33	0	I.	Ec.	Dis.	17	12	55	19	I.	Ec.	Dis.	27	2	35		III.	Sh.	In.			
	19	39		I.	Oc.	Re.		16	8		I.	Oc.	Re.		5	12	50	II.	Ec.	Dis.			
9	4	53	10	III.	Ec.	Dis.	18	7	48		II.	Sh.	In.		5	32		III.	Sh.	Eg.			
	7	36	28	III.	Ec.	Re.		9	48		II.	Tr.	In.		6	31		I.	Sh.	In.			
	8	14		III.	Oc.	Dis.		10	9		I.	Sh.	In.		6	53		III.	Tr.	In.			
	10	49	15	II.	Ec.	Dis.		10	34		II.	Sh.	Eg.		7	35		I.	Tr.	In.			
	11	15		III.	Oc.	Re.		11	8		I.	Tr.	In.		8	47		I.	Sh.	Eg.			
	13	48		I.	Sh.	In.		12	26		I.	Sh.	Eg.		9	52		I.	Tr.	Eg.			
	14	39		I.	Tr.	In.		12	35		II.	Tr.	Eg.		9	59		III.	Tr.	Eg.			
	15	15		II.	Oc.	Re.		13	25		I.	Tr.	Eg.		10	4		II.	Oc.	Re.			
	16	4		I.	Sh.	Eg.	19	7	23	50	I.	Ec.	Dis.	28	3	46	6	I.	Ec.	Dis.			
	16	56		I.	Tr.	Eg.		10	38		I.	Oc.	Re.		7	6		I.	Oc.	Re.			
10	11	1	25	I.	Ec.	Dis.		22	38		III.	Sh.	In.		23	42		II.	Sh.	In.			
	14	9		I.	Oc.	Re.	20	1	33		III.	Sh.	Eg.										

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

FEBRUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	* d		III.	* d	* r	
II.	* d		IV. No Eclipse.			

Configurations at 17^h 30^m for an Inverting Telescope.

Day.	West.			East.		
1		'2 '3	○		4'	'1 ●
2			○	'2 '3	4'	
3			○	'4 ¹ '2		'3
4		2' '1 ⁴	○		3'	
5		4'	○	'2	1'	
6		4'	○	3'	'1	
7		4'	○	'3		
8		'4	○	'2 '3		'1 ●
9		'4	○	'1	'2 '3	
10		'4	○	'1	2'	'3
11		'4	○	'2 '1		3'
12		'2	○	'4	'3	'1
13		3'	○	'1	'2 '4	
14		3'	○	2'	1'	'4
15		'3	○	'1		'4
16	○ 1'		○	'3		'4 '2 ●
17			○	'1	2'	'3 4'
18		'1	○		3'	4'
19		'2	○	'3 ¹		4'
20		3' '1	○	4'	'2	
21		3'	○	'4 ¹		
22		4'	○	'3 2'	'1	
23		4'	○	1'		'2 ● '3 ●
24		4'	○	2'	'3	'1 ●
25		'4	○	'1	3'	
26		'4	○	'1	3'	
27		'4	○	'1	3'	
28		3'	○	'4		

MARCH.

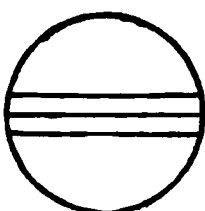
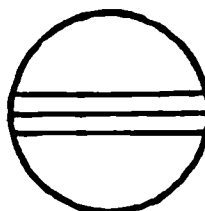
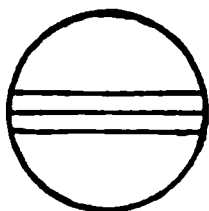
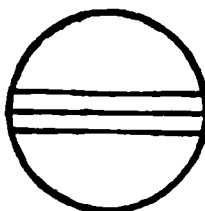
d	h	m	s				d	h	m	s				d	h	m	s			
1	0	59			I.	Sh.	10	4	31			III.	Oc.	20	15	43			I.*	Tr.
	1	57			II.	Tr.		18	36	45		I.	Ec.		17	29			III.*	Sh.
	2	5			I.	Tr.		22	3			I.	Oc.		18	5			II.	Oc.
	2	28			II.	Sh.	11	15	37			II.*	Sh.		19	29			III.	Tr.
	3	16			I.	Sh.		15	49			I.*	Sh.		22	39			III.	Tr.
	4	22			I.	Tr.		17	0			I.*	Tr.	21	9	27	23		I.	Ec.
	4	44			II.	Tr.		18	3			II.	Tr.		12	58			I.	Oc.
	10	14			IV.	Oc.		18	6			I.	Sh.	22	6	39			I.	Sh.
	11	55			IV.	Oc.		18	24			II.	Sh.		7	31			II.	Sh.
	22	14	36		I.	Ec.		19	18			I.	Tr.		7	54			I.	Tr.
2	1	36			I.	Oc.		20	52			II.	Tr.		8	55			I.	Sh.
	16	48	16		III.*	Ec.	12	13	5	15		I.	Ec.		10	6			II.	Tr.
	18	29	29		II.	Ec.		16	32			I.*	Oc.		10	12			I.	Tr.
	19	28			I.	Sh.	13	10	17			I.	Sh.		10	18			II.	Sh.
	19	35	14		III.	Ec.		10	19	19		II.	Ec.		12	54			II.	Tr.
	20	34			I.	Tr.		10	31			III.	Sh.	23	3	55	52		I.	Ec.
	21	10			III.	Oc.		11	29			I.	Tr.		7	27			I.	Oc.
	21	44			I.	Sh.		12	34			I.	Sh.	24	1	7			I.	Sh.
	22	51			I.	Tr.		13	30			III.	Sh.		2	9	5		II.	Ec.
	23	25			II.	Oc.		13	47			I.	Tr.		2	23			I.	Tr.
3	0	16			III.	Oc.		15	20			III.	Tr.		3	24			I.	Sh.
	16	42	59		I.*	Ec.		15	26			II.*	Oc.		4	40			I.	Tr.
	20	5			I.	Oc.		18	28			III.	Tr.		4	41	52		III.	Ec.
4	13	1			II.	Sh.	14	7	33	39		I.	Ec.		7	24			II.	Oc.
	13	56			I.	Sh.		11	1			I.	Oc.		7	32	25		III.	Ec.
	15	3			I.	Tr.	15	4	46			I.	Sh.		9	41			III.	Oc.
	15	20			II.	Tr.		4	55			II.	Sh.		12	52			III.	Oc.
	15	47			II.	Sh.		5	59			I.	Tr.		22	24	14		I.	Ec.
	16	12			I.*	Sh.		7	2			I.	Sh.	25	1	56			I.	Oc.
	17	21			I.*	Tr.		7	24			II.	Tr.		19	35			I.	Sh.
	18	7			II.	Tr.		7	41			II.	Sh.		20	50			II.	Sh.
5	11	11	29		I.	Ec.		8	16			I.	Tr.		20	52			I.	Tr.
	14	35			I.	Oc.		10	12			II.	Tr.		21	52			I.	Sh.
6	6	33			III.	Sh.	16	2	2	9		I.	Ec.		23	9			I.	Tr.
	7	46	7		II.	Ec.		5	31			I.	Oc.		23	26			II.	Tr.
	8	24			I.	Sh.		23	14			I.	Sh.		23	37			II.	Sh.
	9	31			III.	Sh.		23	35	55		II.	Ec.	26	2	14			II.	Tr.
	9	33			I.	Tr.	17	0	28			I.	Tr.		2	41			IV.	Sh.
	10	41			I.	Sh.		0	44	0		III.	Ec.		3	36			IV.	Sh.
	11	8			III.	Tr.		1	31			I.	Sh.		14	21			IV.	Tr.
	11	50			I.	Tr.		2	45			I.	Tr.		16	31			IV.*	Tr.
	12	46			II.	Oc.		3	33	22		III.	Ec.		16	52	43		I.*	Ec.
	14	15			III.	Tr.		4	46			II.	Oc.	27	20	25			I.	Oc.
7	5	39	53		I.	Ec.		5	34			III.	Oc.		14	4			I.	Sh.
	9	4			I.	Oc.		5	34			III.	Oc.		15	20			I.*	Tr.
8	2	19			II.	Sh.		8	43			IV.	Oc.		15	25	40		II.*	Ec.
	2	52			I.	Sh.		18	21	43		IV.	Ec.		16	20			I.*	Sh.
	4	2			I.	Tr.		19	13	21		IV.	Ec.		17	38			I.	Tr.
	4	41			II.	Tr.		20	30	30		I.	Ec.		18	27			III.	Sh.
	5	5			II.	Sh.	18	0	0			I.	Oc.		20	42			II.	Oc.
	5	9			I.	Sh.		5	19			IV.	Oc.		21	28			III.	Sh.
	6	19			I.	Tr.		7	25			IV.	Oc.	28	23	34			III.	Tr.
	7	29			II.	Tr.		17	42			I.	Sh.		2	45	6		I.	Ec.
9	0	8	23		I.	Ec.		18	14			II.	Sh.		11	21			I.*	Oc.
	3	34			I.	Oc.		18	56			I.	Tr.	29	14	53			I.	Sh.
	19	31			IV.	Tr.		19	59			II.	Tr.		8	32			I.	Tr.
	20	46	14		III.	Ec.		20	46			II.	Sh.		9	49			II.	Sh.
	21	2	44		II.	Ec.		21	0			I.	Tr.		10	7			I.	Sh.
	21	18			IV.	Tr.		21	14			II.	Sh.		10	49			I.	Tr.
	21	21			I.	Sh.	19	14	59	0		I.*	Ec.		12	6			II.	Tr.
	22	31			I.	Tr.		18	29			I.	Oc.		12	45			II.	Sh.
	23	34	24		III.	Ec.		12	10			II.	Sh.		12	54			II.	Sh.
10	0	48			I.	Sh.	20	12	52	30		I.	Tr.		15	33			II.*	Tr.
	1	24			III.	Oc.		13	25			II.	Tr.	30	5	49	35		I.	Ec.
	2	6			II.	Oc.		14	27			I.	Sh.		9	22			I.	Oc.
								14	29			III.	Sh.	31	3	0			I.	Sh.
															4	17			I.	Tr.
															4	42	15		II.	Ec.
															5	17			I.	Sh.
															6	35			I.	Tr.
															8	40	16		III.	Ec.
															10	0			III.	Oc.
															11	32	0		III.	Ec.
															13	45			III.	Oc.
															16	57			III.*	Oc.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.
(Eph 13)

WASHINGTON MEAN TIME.

MARCH.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	* d		III.	* d	* r	
II.	* d		IV.	** dr		

Configurations at 16^h 30^m for an Inverting Telescope.

Day.	West.				East.			
1			'3	2' '1	○	'4		
2				'3 2	○	1'	'4	
3				'1	○	'3 2	'4	
4	○ 2'	○ 1'			○		'3	'4
5			'2		○	'1	3'	4'
6				1' 3'	○	'2		4'
7			3'		○	'1 2'		4'
8			'3	2' '1	○		4'	
9				'3 2	○	1'		
10				4' '1	○	'3 2		
11			4'		○	1' 2'	3'	
12		4'		2'	○		3'	'1 ●
13	○ 3'	4'		1'	○	'2		
14		'4		3'	○	'1 2'		
15		'4	'3	1' 2'	○			
16			'4	'3 2	○	1'		
17				'4 1	○	'3 2		
18					○	1' 2'	'4	'3
19				2'	○		3' 4	'1 ●
20				1'	○	3'		'4
21				3'	○	'1 2'		'4
22			'3	1' 2'	○			4'
23			'3 2		○	'1		4'
24				'1	○	'3 2		4'
25					○	1' 2'	4'	'3
26	○ 4'		2'	'1	○		3'	
27	○ 1'		4'		○	3'		'2 ●
28		4'		3'	○	'1	'2	
29		4'	3'	1' 2'	○			
30		4'		'3 2	○	'1		
31		'4		'1	○	'2		'3 ●

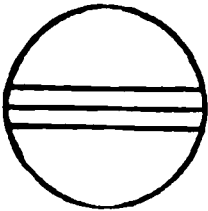
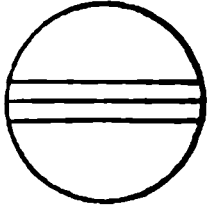
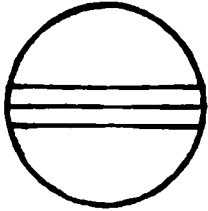
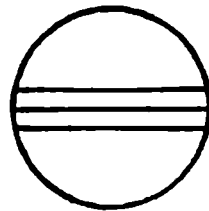
APRIL.														
d	h	m	s				d	h	m	s				
1	0	17	56	I.	Ec.	Dis.	11	2	22		III.	Sh.	In.	
	3	51		I.	Oc.	Re.		5	25		III.	Sh.	Eg.	
	21	28		I.	Sh.	In.		7	33		III.	Tr.	In.	
	22	46		I.	Tr.	In.		10	46		III.	Tr.	Eg.	
	23	26		II.	Sh.	In.		15	8	30	I.*	Ec.	Dis.	
	23	45		I.	Sh.	Eg.		18	42		I.	Oc.	Re.	
2	1	3		I.	Tr.	Eg.		20	30		IV.	Sh.	In.	
	2	5		II.	Tr.	In.		21	55		IV.	Sh.	Eg.	
	2	13		II.	Sh.	Eg.	12	8	29		IV.	Tr.	In.	
	4	53		II.	Tr.	Eg.		10	54		IV.	Tr.	Eg.	
	18	46	25	I.	Ec.	Dis.		12	18		I.	Sh.	In.	
	22	20		I.	Oc.	Re.		13	36		I.*	Tr.	In.	
3	12	8	0	IV.	Ec.	Dis.		14	35		I.*	Sh.	Eg.	
	13	28	17	IV.	Ec.	Re.		15	19		II.*	Sh.	In.	
	15	57		I.*	Sh.	In.		15	53		I.*	Tr.	Eg.	
	17	14		I.*	Tr.	In.		17	58		II.	Tr.	In.	
	17	58	51	II.	Ec.	Dis.		18	7		II.	Sh.	Eg.	
	18	13		I.	Sh.	Eg.		20	47		II.	Tr.	Eg.	
	19	32		I.	Tr.	Eg.	13	9	36	59	I.	Ec.	Dis.	
	22	24		III.	Sh.	In.		13	10		I.	Oc.	Re.	
	23	18		II.	Oc.	Re.	14	6	46		I.	Sh.	In.	
	23	46		IV.	Oc.	Dis.		8	4		I.	Tr.	In.	
4	1	27		III.	Sh.	Eg.		9	3		I.	Sh.	Eg.	
	2	9		IV.	Oc.	Re.		9	48	42	II.	Ec.	Dis.	
	3	36		III.	Tr.	In.		10	21		I.	Tr.	Eg.	
	6	48		III.	Tr.	Eg.		15	8		II.*	Oc.	Re.	
	13	14	48	I.	Ec.	Dis.		16	37	8	III.*	Ec.	Dis.	
	16	48		I.*	Oc.	Re.		19	31	10	III.	Ec.	Re.	
5	10	25		I.	Sh.	In.		21	42		III.	Oc.	Dis.	
	11	43		I.	Tr.	In.	15	0	56		III.	Oc.	Re.	
	12	42		I.	Sh.	Eg.		4	5	20	I.	Ec.	Dis.	
	12	44		II.	Sh.	In.		7	38		I.	Oc.	Re.	
	14	0		I.	Tr.	Eg.	16	1	15		I.	Sh.	In.	
	15	23		II.*	Tr.	In.		2	32		I.	Tr.	In.	
	15	31		II.*	Sh.	Eg.		3	32		I.	Sh.	Eg.	
	18	11		II.	Tr.	Eg.		4	38		II.	Sh.	In.	
6	7	43	17	I.	Ec.	Dis.		4	49		I.	Tr.	Eg.	
	11	17		I.	Oc.	Re.		7	16		II.	Tr.	In.	
7	4	53		I.	Sh.	In.		7	26		II.	Sh.	Eg.	
	6	11		I.	Tr.	In.		10	5		II.	Tr.	Eg.	
	7	10		I.	Sh.	Eg.		22	33	49	I.	Ec.	Dis.	
	7	15	27	II.	Ec.	Dis.	17	2	6		I.	Oc.	Re.	
	8	29		I.	Tr.	Eg.		19	43		I.	Sh.	In.	
	12	35		II.	Oc.	Re.		21	0		I.	Tr.	In.	
	12	38	27	III.	Ec.	Dis.		22	0		I.	Sh.	Eg.	
	15	31	20	III.*	Ec.	Re.		23	5	22	II.	Ec.	Dis.	
	17	45		III.	Oc.	Dis.		23	17		I.	Tr.	Eg.	
	20	58		III.	Oc.	Re.	18	4	23		II.	Oc.	Re.	
8	2	11	38	I.	Ec.	Dis.		6	19		III.	Sh.	In.	
	5	45		I.	Oc.	Re.		9	24		III.	Sh.	Eg.	
	23	21		I.	Sh.	In.		11	26		III.	Tr.	In.	
9	0	39		I.	Tr.	In.		14	41		III.*	Tr.	Eg.	
	1	38		I.	Sh.	Eg.		17	2	12	I.	Ec.	Dis.	
	2	2		II.	Sh.	In.		20	35		I.	Oc.	Re.	
	2	57		I.	Tr.	Eg.	19	14	11		I.*	Sh.	In.	
	4	41		II.	Tr.	In.		15	28		I.*	Tr.	In.	
	4	49		II.	Sh.	Eg.		16	28		I.*	Sh.	Eg.	
	7	30		II.	Tr.	Eg.		17	45		I.	Tr.	Eg.	
	20	40	7	I.	Ec.	Dis.		17	56		II.	Sh.	In.	
10	0	14		I.	Oc.	Re.		20	33		II.	Tr.	In.	
	17	50		I.	Sh.	In.		20	43		II.	Sh.	Eg.	
	19	8		I.	Tr.	In.		23	22		II.	Tr.	Eg.	
	20	7		I.	Sh.	Eg.	20	5	58	14	IV.	Ec.	Dis.	
	20	32	5	II.	Ec.	Dis.		7	39	30	IV.	Ec.	Re.	
	21	25		I.	Tr.	Eg.		11	30	41	I.	Ec.	Dis.	
11	1	52		II.	Oc.	Re.		15	3		I.*	Oc.	Re.	

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

WASHINGTON MEAN TIME.

APRIL.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	* d		III.	* d	* r	
II.	* d		IV.	* d	* r	

Configurations at 15^h 0^m for an Inverting Telescope.

Day.	West.			East.		
1		4	○	1' 2'	3	
2		4	2' 1'	○	3'	
3			2' 4'	○	1' 3'	
4			3'	○	4' 2'	1' ●
5		3'	1' 2'	○	4	
6		3	2'	○	1	4
7			1'	○	2	4 3' ●
8				○	1' 2' 3	4'
9			1' 2'	○	3'	4'
10			2'	○	1' 3' 4'	
11			3' 1'	○	4' 2'	
12	○ 1'	3'	4'	○ 2'		
13		3 4' 2'	○	1		
14		4'	1' 3'	○		2' ●
15		4'		○	1' 3' 2'	
16		4	1' 2'	○		3
17		4	2'	○	1' 3'	
18		4	1' 3'	○	2	
19		3' 4	○	1' 2'		
20		3 2'	4'	○		1' ●
21			3 1'	○	4	2' ●
22				○	1' 3' 2'	4
23			1' 2'	○	3	4
24			2'	○	1' 3'	4
25			1'	○	2	4'
26		3'	○	1' 2'		4'
27		3 2'	○		4'	1' ●
28		3	1' ○	4'		2' ●
29			4'	○	1' 3' 2'	
30	○ 2'	4'	1'	○		3

MAY.

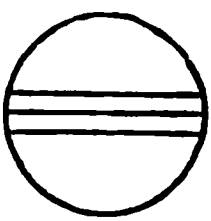
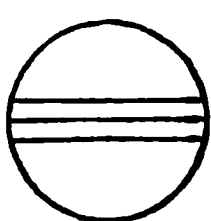
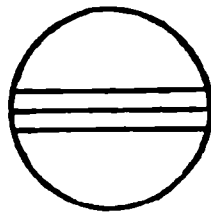
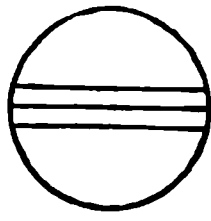
d	h	m	s				d	h	m	s				d	h	m	s					
1	2	21	14	I.	Ec.	Dis.	11	1	43			II.	Sh.	In.	21	10	41			I.	Sh.	In.
	5	49		I.	Oc.	Re.		3	58			II.	Tr.	In.		11	38			I.*	Tr.	In.
	23	29		I.	Sh.	In.		4	31			II.	Sh.	Eg.		12	58			I.*	Sh.	Eg.
2	0	41		I.	Tr.	In.		6	47			II.	Tr.	Eg.		13	56			I.*	Tr.	Eg.
	1	46		I.	Sh.	Eg.		17	11	54		I.	Ec.	Dis.		17	37			II.	Sh.	In.
	2	59		I.	Tr.	Eg.		20	33			I.	Oc.	Re.		19	33			II.	Tr.	In.
	4	12	13	II.	Ec.	Dis.	12	14	19			I.*	Sh.	In.		20	26			II.	Sh.	Eg.
	9	20		II.	Oc.	Re.		15	24			I.*	Tr.	In.		22	23			II.	Tr.	Eg.
	14	16		III.*	Sh.	In.		16	36			I.	Sh.	Eg.	22	8	2	36		I.	Ec.	Dis.
	17	22		III.	Sh.	Eg.		17	42			I.	Tr.	Eg.		11	15			I.*	Oc.	Re.
	19	1		III.	Tr.	In.		20	2	48		II.	Ec.	Dis.	23	5	9			I.	Sh.	In.
	20	49	38	I.	Ec.	Dis.	18	0	58			II.	Oc.	Re.		6	5			I.	Tr.	In.
	22	17		III.	Tr.	Eg.		8	29	9		III.	Ec.	Dis.		7	26			I.	Sh.	Eg.
3	0	17		I.	Oc.	Re.		11	27	39		III.	Ec.	Re.		8	23			I.	Tr.	Eg.
	17	57		I.	Sh.	In.		11	40	17		I.*	Ec.	Dis.		11	53	43		II.*	Ec.	Dis.
	19	8		I.	Tr.	In.		12	42			III.*	Oc.	Dis.		16	31			II.	Oc.	Re.
	20	14		I.	Sh.	Eg.		15	0			I.*	Oc.	Re.		17	45	16		IV.	Ec.	Dis.
	21	26		I.	Tr.	Eg.		15	58			III.*	Oc.	Re.		19	58	44		IV.	Ec.	Re.
	23	7		II.	Sh.	In.	14	8	47			I.	Sh.	In.	24	2	3			IV.	Oc.	Dis.
4	1	31		II.	Tr.	In.		9	51			I.	Tr.	In.		2	10			III.	Sh.	In.
	1	55		II.	Sh.	Eg.		11	5			I.	Sh.	Eg.		2	31	2		I.	Ec.	Dis.
	4	21		II.	Tr.	Eg.		12	9			I.*	Tr.	Eg.		4	52			IV.	Oc.	Re.
	15	18	8	I.*	Ec.	Dis.		15	2			II.*	Sh.	In.		5	20			III.	Sh.	Eg.
	18	44		I.	Oc.	Re.		17	10			II.	Tr.	In.		5	42			I.	Oc.	Re.
5	12	26		I.*	Sh.	In.		17	50			II.	Sh.	Eg.		5	50			III.	Tr.	In.
	13	35		I.*	Tr.	In.		20	0			II.	Tr.	Eg.		9	6			III.	Tr.	Eg.
	14	43		I.*	Sh.	Eg.	15	6	8	46		I.	Ec.	Dis.		23	38			I.	Sh.	In.
	15	53		I.*	Tr.	Eg.		8	16			IV.	Sh.	In.	25	0	32			I.	Tr.	In.
	17	29	3	II.	Ec.	Dis.		9	27			I.	Oc.	Re.		1	55			I.	Sh.	Eg.
	22	33		II.	Oc.	Re.		10	22			IV.	Sh.	Eg.		2	50			I.	Tr.	Eg.
6	4	31	5	III.	Ec.	Dis.		18	1			IV.	Tr.	In.		6	55			II.	Sh.	In.
	7	28	29	III.	Ec.	Re.		20	44			IV.	Tr.	Eg.		8	44			II.	Tr.	In.
	9	4		III.	Oc.	Dis.	16	3	16			I.	Sh.	In.		9	43			II.	Sh.	Eg.
	9	46	30	I.	Ec.	Dis.		4	18			I.	Tr.	In.		11	33			II.*	Tr.	Eg.
	12	20		III.*	Oc.	Re.		5	33			I.	Sh.	Eg.		20	59	34		I.	Ec.	Dis.
	13	12		I.*	Oc.	Re.		6	36			I.	Tr.	Eg.	26	0	9			I.	Oc.	Re.
	23	51	14	IV.	Ec.	Dis.		9	19	42		II.	Ec.	Dis.		18	6			I.	Sh.	In.
7	1	49	40	IV.	Ec.	Re.		14	9			II.*	Oc.	Re.		18	58			I.	Tr.	In.
	6	54		I.	Sh.	In.		22	12			III.	Sh.	In.		20	23			I.	Sh.	Eg.
	8	3		I.	Tr.	In.	17	0	37	11		I.	Ec.	Dis.		21	16			I.	Tr.	Eg.
	9	11		I.	Sh.	Eg.		1	21			III.	Sh.	Eg.	27	1	10	51		II.	Ec.	Dis.
	10	12		IV.	Oc.	Dis.		2	18			III.	Tr.	In.		5	41			II.	Oc.	Re.
	10	21		I.	Tr.	Eg.		3	54			I.	Oc.	Re.		15	27	59		I.*	Ec.	Dis.
	12	26		II.*	Sh.	In.		5	35			III.	Tr.	Eg.		16	26	22		III.	Ec.	Dis.
	12	55		IV.*	Oc.	Re.		21	44			I.	Sh.	In.		18	35			I.	Oc.	Re.
	14	45		II.*	Tr.	In.		22	45			I.	Tr.	In.		19	27	1		III.	Ec.	Re.
	15	14		II.*	Sh.	Eg.	18	0	1			I.	Sh.	Eg.		19	46			III.	Oc.	Dis.
	17	35		II.	Tr.	Eg.		1	3			I.	Tr.	Eg.		23	3			III.	Oc.	Re.
8	4	14	59	I.	Ec.	Dis.		4	19			II.	Sh.	In.	28	12	34			I.*	Sh.	In.
	7	39		I.	Oc.	Re.		6	22			II.	Tr.	In.		13	25			I.*	Tr.	In.
9	1	22		I.	Sh.	In.		7	7			II.	Sh.	Eg.		14	52			I.*	Sh.	Eg.
	2	30		I.	Tr.	In.		9	10			II.	Tr.	Eg.		15	43			I.*	Tr.	Eg.
	3	39		I.	Sh.	Eg.		19	5	42		I.	Ec.	Dis.		20	13			II.	Sh.	In.
	4	48		I.	Tr.	Eg.		22	21			I.	Oc.	Re.		21	54			II.	Tr.	In.
	6	45	53	II.	Ec.	Dis.	19	16	12			I.*	Sh.	In.		23	2			II.	Sh.	Eg.
	11	46		II.	Oc.	Re.		17	12			I.	Tr.	In.	29	0	44	29		II.	Tr.	Eg.
	18	14		III.	Sh.	In.		18	30			I.	Sh.	Eg.		9	56			I.	Ec.	Dis.
	21	22		III.	Sh.	Eg.		19	30			I.	Tr.	Eg.	30	13	2			I.*	Oc.	Re.
	22	42		III.	Tr.	In.		22	36	43		II.	Ec.	Dis.		7	51			I.	Sh.	In.
	22	43	23	I.	Ec.	Dis.	20	3	20			II.	Oc.	Re.		9	20			I.	Sh.	Eg.
10	1	58		III.	Tr.	Eg.		12	27	50		III.*	Ec.	Dis.		10	9			I.	Tr.	Eg.
	2	6		I.	Oc.	Re.		13	34	6		I.*	Ec.	Dis.		14	27	56		II.*	Ec.	Dis.
	19	51		I.	Sh.	In.		15	27	25		III.*	Ec.	Re.		18	50			II.	Oc.	Re.
	20	57		I.	Tr.	In.		16	16			III.	Oc.	Dis.	31	4	24	56		I.	Ec.	Dis.
	22	8		I.	Sh.	Eg.		16	48			I.	Oc.	Re.		6	8			III.	Sh.	In.
	23	15		I.	Tr.	Eg.		19	33			III.	Oc.	Re.		7	28			I.	Oc.	Re.
																9	17			III.	Tr.	Eg.
																9	19			III.*	Sh.	Eg.
																12	34					

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.
(Eph 13)

WASHINGTON MEAN TIME.

MAY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	[*] d		III.	[*] d	[*] r	
II.	[*] d		IV.	[*] d	[*] r	

Configurations at 14^h 0^m for an Inverting Telescope.

Day.	West.				East.			
1		4°		2°	○	1°		3°
2		4°		1°	○	3°		
3		4°		3°	○	1°	2°	
4		4°	3°	2°	1°	○		
5	○ 1°		4°	3°	2°	○		
6			4°		○	3°		2°
7				1°	○	2°		3°
8				2°	○	1°	4°	3°
9				1°	○	2°	3°	4°
10				3°	○	1°	2°	4°
11			3°	2°	1°	○		4°
12			3°	2°	○	1°		4°
13					○	2°	4°	1° ● 3° ●
14				1°	○	2°	4°	3°
15			2°		○	4°	1°	3°
16			4°	1°	○	3°		2° ●
17			4°	3°	○	1°	2°	
18		4°	3°	1°	○			
19		4°	3°	2°	○	1°		
20		4°			○	2°		1° ● 3° ●
21		4°			1°	○	2°	3°
22			4°	2°	○	1°		3°
23				1°	○		3°	2° ●
24				3°	○	4°	1°	2°
25			3°	1°	2°	○		4°
26			3°	2°	○	1°		4°
27				3°	1°	○	2°	4°
28	○ 1°				○	2°	3°	4°
29			2°		○	1°	3°	4°
30				1°	2°	○	3°	4°
31				3°	○	1°	4°	

WASHINGTON MEAN TIME.

JUNE.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	1	31			10	6	19	49		20	15	2			I.*	Sh.		Eg.	
	2	14				10	17				15	23			I.*	Tr.		Eg.	
	2	18				19	15	56			22	12	4		II.	Ec.		Dis.	
	3	49				22	6			21	1	40			II.	Oc.		Re.	
	4	34			11	0	24	0			10	7	6		I.*	Ec.		Dis.	
	4	36				5	52				12	43			I.*	Oc.		Re.	
	9	24				16	22				18	4			III.	Sh.		In.	
	9	30				16	55				19	21			III.	Tr.		In.	
11	3					18	39				21	18			III.	Sh.		Eg.	
12	12					19	13				22	37			III.	Tr.		Eg.	
12	19				12	1	24			22	7	13			I.	Sh.		In.	
13	53					2	30				7	31			I.	Tr.		In.	
22	53	29				4	13				9	31			I.*	Sh.		Eg.	
2	1	55				5	20				9	49			I.*	Tr.		Eg.	
20	0					13	44	29			17	17			II.	Sh.		In.	
20	44					16	32				17	53			II.	Tr.		In.	
22	17				18	10	50				20	7			II.	Sh.		Eg.	
23	2					11	21				20	43			II.	Tr.		Eg.	
3	3	45	13			13	8			23	4	35	42		I.	Ec.		Dis.	
8	0					13	39				7	9			I.	Oc.		Re.	
17	21	55				19	37	6		24	1	42			I.	Sh.		In.	
20	21					23	25				1	57			I.	Tr.		In.	
20	25	27			14	8	12	58			3	59			I.	Sh.		Eg.	
4	2	30				10	58				4	15			I.	Tr.		Eg.	
14	28					14	5				11	29	50		II.*	Ec.		Dis.	
15	10					16	2				14	47			II.*	Oc.		Re.	
16	46					17	18				23	4	13		I.	Ec.		Dis.	
17	28					19	19			25	1	35			I.	Oc.		Re.	
22	49				15	5	19				8	21	6		III.	Ec.		Dis.	
5	0	13				5	47				12	29			III.*	Oc.		Re.	
1	37					7	36				20	10			I.	Sh.		In.	
3	3					8	5				20	23			I.	Tr.		In.	
11	50	27				14	42				22	28			I.	Sh.		Eg.	
14	47					15	38				22	41			I.	Tr.		Eg.	
6	8	56				17	31			26	5	38	24		IV.	Ec.		Dis.	
9	36					18	28				6	35			II.	Sh.		In.	
11	14				16	2	41	33			7	1			II.	Tr.		In.	
11	54					5	25				9	25			II.*	Sh.		Eg.	
17	2	23				23	47				9	50			II.*	Tr.		Eg.	
21	8				17	0	13				10	23			IV.*	Oc.		Re.	
7	6	18	55			2	5				17	32	47		I.	Ec.		Dis.	
9	14					2	31				20	1			I.	Oc.		Re.	
10	6					8	54	41			14	38			I.*	Sh.		In.	
12	41					12	33			27	14	49			I.*	Tr.		In.	
13	18					20	13				16	56			I.	Sh.		Eg.	
15	58					21	10	2			17	7			I.	Tr.		Eg.	
8	3	25				22	46			28	0	47	19		II.	Ec.		Dis.	
4	3					23	51				3	55			II.	Oc.		Re.	
5	42				18	0	2				12	1	20		I.*	Ec.		Dis.	
6	21					2	52				14	27			I.*	Oc.		Re.	
12	6					4	22	32			22	3			III.	Sh.		In.	
13	21					9	12				22	38			III.	Tr.		In.	
14	55					18	16				1	18			III.	Sh.		Eg.	
16	11					18	39			29	1	55			III.	Tr.		Eg.	
9	0	47	29			20	34				9	7			I.*	Sh.		In.	
3	40					20	57				9	15			I.*	Tr.		In.	
11	40	52			19	4	0				11	25			I.*	Sh.		Eg.	
14	7	37				4	46				11	33			I.*	Tr.		Eg.	
17	4					6	49				19	53			II.	Sh.		In.	
19	56					7	36				20	8			II.	Tr.		In.	
21	53					15	38	35			22	42			II.	Sh.		Eg.	
22	29					18	17				22	57			II.	Tr.		Eg.	
10	0	11			20	12	44				6	29	57		I.	Ec.		Dis.	
	0	47				13	5				8	53			I.*	Oc.		Re.	

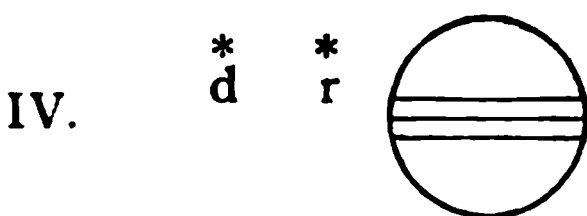
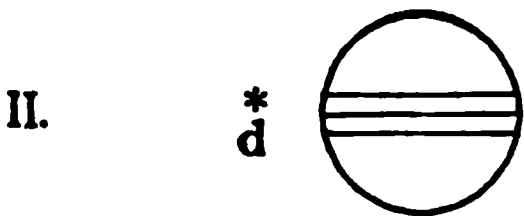
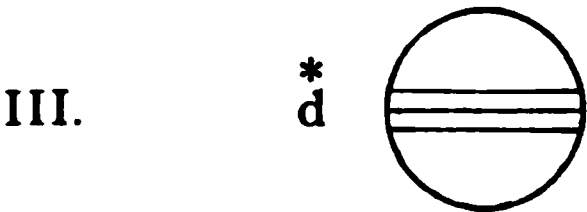
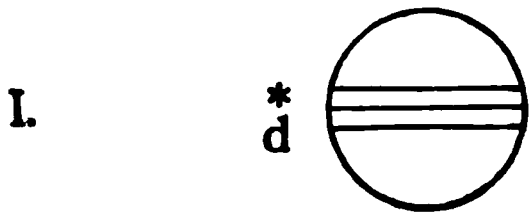
NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.

[Eph 13]

WASHINGTON MEAN TIME.

JUNE.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



Configurations at 12^h 30^m for an Inverting Telescope.

Day.	West.				East.			
1	○ 2°		3°	1°	4° ○			
2			3°	4° 2°	○	1°		
3		4°		3° 1°	○	2°		
4		4°			○	1° 3° 2°		
5		4°		2°	○		3°	1° ●
6		4°		2° 1°	○		3°	
7		4°			○	1° 2°		
8			3° 4°	1°	○			
9			3°	2°	○	1°		4° ●
10				3° 1°	○	2° 4°		
11					○	1° 3° 2°	4°	
12				2° 1°	○		3° 4°	
13	○ 1°			2°	○		3° 4°	
14					○	1° 3° 2°	4°	
15			3°	1°	○	2°	4°	
16			3°	2°	○	1°	4°	
17				3° 1°	○	4°		2° ●
18				4°	○	3° 1° 2°		
19			4°	2° 1°	○		3°	
20		4°		2°	○	1°	3°	
21		4°			○	3° 2°		1° ●
22		4°		3° 1°	○	2°		
23		4°	3°	2°	○	1°		
24			4°	3° 1°	○			2° ●
25				4°	○	3° 1° 2°		
26				1° 2°	○	4°	3°	
27				2°	○	1°	4° 3°	
28					○	3° 2°	4°	1° ●
29			3°	1°	○	2°	4°	
30			3°	2°	○	1°	4°	

SATELLITES OF JUPITER, 1913.

WASHINGTON MEAN TIME.

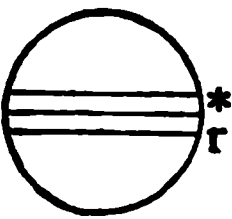
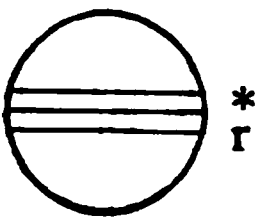
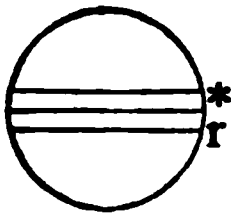
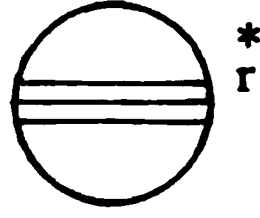
JULY.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation, Tr., transit of the satellite, Sh., transit of the shadow; * Visible at 1
[Eph 13]

WASHINGTON MEAN TIME.

JULY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		III.	
II.		IV.	

Configurations at 11^h 30^m for an Inverting Telescope.

Day.	West.	East.
1	'3 '1 '2 ○	4°
2		'3 ○ '1 '2 4°
3	○ 2°	'1 ○ '3 4°
4		'2 ○ 4° '1 3°
5		4° '1 ○ '2 3°
6	○ 1°	4° 3° ○ 2°
7	4° 3° 2°	○ '1
8	4° '3 '1	○
9	'4 '3	○ '1 '2
10	○ 2° '4 '1	○ '3
11	'4 '2	○ '1 '3
12		'1 ○ '2 3°
13		3° ○ 1° '4 2°
14	3° 2°	○ 4° '1 ●
15	'3 '2 '1	○ 4°
16		'3 ○ '1 '2 4°
17		'1 ○ 2° '3 4°
18	2°	○ '1 '3 4°
19		'1 ○ '2 3° 4°
20	○ 3°	○ '1 '4 2°
21	3° 2° '1	○
22	'3 4° '2 '1	○
23	4° '3	○ '1 '2
24	4° '1	○ 2° '3
25	'4 2°	○ '1 '3
26	'4 '1	○ 3° '2 ●
27	4°	○ '1 2° 3°
28	'3 2° '1	○
29	○ 1° '3 '2	○
30		'3 ○ '1 '2 '4
31		'1 ○ '3 2° 4°

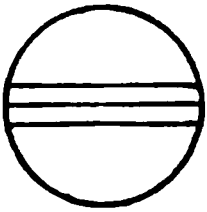
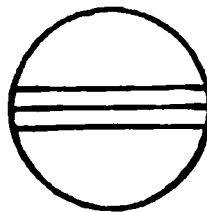
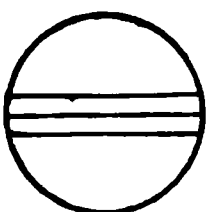
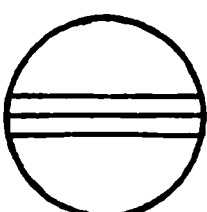
AUGUST.													
d	h	m	s				d	h	m	s			
1	2	24		I.	Oc.	Dis.	11	12	34		II.*	Tr.	Eg.
	5	18	35	I.	Ec.	Re.		14	16		II.	Sh.	Eg.
	23	32		I.	Tr.	In.		17	4		I.	Oc.	Dis.
2	0	12		I.	Sh.	In.		20	10	46	I.	Ec.	Re.
	1	50		I.	Tr.	Eg.	12	14	12		I.	Tr.	In.
	2	30		I.	Sh.	Eg.		15	4		I.	Sh.	In.
	12	24		II.*	Oc.	Dis.		16	30		I.	Tr.	Eg.
	16	33	38	II.	Ec.	Re.		17	22		I.	Sh.	Eg.
	20	51		I.	Oc.	Dis.	18	3	54		II.	Oc.	Dis.
	23	47	14	I.	Ec.	Re.		8	29	57	II.*	Ec.	Re.
3	15	12		III.	Tr.	In.		11	30		I.*	Oc.	Dis.
	17	58		I.	Tr.	In.		14	39	27	I.	Ec.	Re.
	18	0		III.	Sh.	In.	14	8	35		III.*	Oc.	Dis.
	18	27		III.	Tr.	Eg.		8	39		I.*	Tr.	In.
	18	40		I.	Sh.	In.		9	33		I.*	Sh.	In.
	20	16		I.	Tr.	Eg.		10	57		I.*	Tr.	Eg.
	20	59		I.	Sh.	Eg.		11	51		I.*	Sh.	Eg.
	21	20		III.	Sh.	Eg.		11	51		III.*	Oc.	Re.
4	7	25		II.	Tr.	In.		12	16	48	III.*	Ec.	Dis.
	8	50		II.*	Sh.	In.		15	28	14	III.	Ec.	Re.
	10	15		II.*	Tr.	Eg.		22	54		II.	Tr.	In.
	11	40		II.*	Sh.	Eg.	15	0	43		II.	Sh.	In.
	15	17		I.	Oc.	Dis.		1	44		II.	Tr.	Eg.
	18	15	58	I.	Ec.	Re.		3	11		IV.	Oc.	Dis.
5	12	25		I.*	Tr.	In.		3	34		II.	Sh.	Eg.
	13	9		I.*	Sh.	In.		5	57		I.	Oc.	Dis.
	14	43		I.	Tr.	Eg.		6	6		IV.	Oc.	Re.
	15	27		I.	Sh.	Eg.		9	8	10	I.*	Ec.	Re.
6	1	34		II.	Oc.	Dis.		11	37	45	IV.*	Ec.	Dis.
	5	52	35	II.	Ec.	Re.		14	47	19	IV.	Ec.	Re.
	9	44		I.*	Oc.	Dis.	16	3	6		I.	Tr.	In.
	12	44	38	I.*	Ec.	Re.		4	2		I.	Sh.	In.
	19	4		IV.	Tr.	In.		5	24		I.	Tr.	Eg.
	21	57		IV.	Tr.	Eg.		6	20		I.	Sh.	Eg.
7	2	16		IV.	Sh.	In.		17	5		II.	Oc.	Dis.
	5	7		III.	Oc.	Dis.		21	48	18	II.	Ec.	Re.
	5	25		IV.	Sh.	Eg.	17	0	24		I.	Oc.	Dis.
	6	51		I.	Tr.	In.		3	36	52	I.	Ec.	Re.
	7	38		I.*	Sh.	In.		21	33		I.	Tr.	In.
	9	9		I.*	Tr.	Eg.		22	9		III.	Tr.	In.
	9	56		I.*	Sh.	Eg.		22	31		I.	Sh.	In.
	11	27	55	III.*	Ec.	Re.		23	51		I.	Tr.	Eg.
	20	34		II.	Tr.	In.	18	0	49		I.	Sh.	Eg.
	22	8		II.	Sh.	In.		1	25		III.	Tr.	Eg.
	23	24		II.	Tr.	Eg.		2	1		III.	Sh.	In.
8	0	58		II.	Sh.	Eg.		5	22		III.	Sh.	Eg.
	4	10		I.	Oc.	Dis.		12	5		II.*	Tr.	In.
	7	13	21	I.	Ec.	Re.		14	1		II.	Sh.	In.
9	1	18		I.	Tr.	In.		14	55		II.	Tr.	Eg.
	2	7		I.	Sh.	In.		16	52		II.	Sh.	Eg.
	3	36		I.	Tr.	Eg.		18	51		I.	Oc.	Dis.
	4	25		I.	Sh.	Eg.		22	5	37	I.	Ec.	Re.
	14	43		II.	Oc.	Dis.	19	16	0		I.	Tr.	In.
	19	10	51	II.	Ec.	Re.		16	59		I.	Sh.	In.
	22	37		I.	Oc.	Dis.		18	18		I.	Tr.	Eg.
10	1	42	1	I.	Ec.	Re.		19	18		I.	Sh.	Eg.
	18	38		III.	Tr.	In.	20	6	17		II.	Oc.	Dis.
	19	45		I.	Tr.	In.		11	7	33	II.*	Ec.	Re.
	20	35		I.	Sh.	In.		13	18		I.	Oc.	Dis.
	21	54		III.	Tr.	Eg.		16	34	20	I.	Ec.	Re.
	22	0		III.	Sh.	In.	21	10	27		I.*	Tr.	In.
	22	3		I.	Tr.	Eg.		11	28		I.*	Sh.	In.
	22	54		I.	Sh.	Eg.		12	7		III.*	Oc.	Dis.
11	1	21		III.	Sh.	Eg.		12	45		I.*	Tr.	Eg.
	9	44		II.*	Tr.	In.		13	46		I.	Sh.	Eg.
	11	26		II.*	Sh.	In.		15	23		III.	Oc.	Re.

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.
Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; * Visible at Washington.
[Eph 13]

WASHINGTON MEAN TIME.

AUGUST.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		* r	III.		* d r
II.		* r	IV.		* d r

Configurations at 10^h 0^m for an Inverting Telescope.

Day.	West.			East.		
1		2°	○	1°	3°	4°
2		1° 2°	○	3°		4°
3			○	3° 1° 2°		4°
4	○ 2°	3° 1°	○		4°	
5		3° 2°	○	1°	4°	
6		3°	○	4° 2°		1° ●
7		4° 1°	○	2°		3° ●
8		4° 2°	○	1°	3°	
9	4°	1° 2°	○	3°		
10	4°		○	3° 1° 2°		
11	○ 2° 4°	3° 1°	○			
12	4°	3° 2°	○	1°		
13	4°	3° 1°	○	2°		
14	○ 1°	4°	○	2°		3° ●
15		2°	○	4° 1°	3°	
16		2° 1°	○	4° 3°		
17			○	1° 3° 2°	4°	
18		3° 1°	○	2°		4°
19		3° 2°	○	1°	4°	
20		3° 1°	○		4°	2° ●
21			○	1° 2°	4°	
22		2°	○	3° 4°		1° ●
23		2° 1°	○	3°		
24		4°	○	1° 2° 3°		
25		4° 1° 3°	○	2°		
26	4°	3° 2°	○	1°		
27	4°	3° 1°	○			2° ●
28	4°	3°	○	1° 2°		
29	4°	2°	○	3°		1° ●
30		4° 2° 1°	○	3°		
31		4°	○	1° 2° 3°		

SATELLITES OF JUPITER, 1913.

WASHINGTON MEAN TIME.

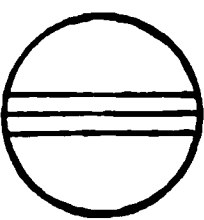
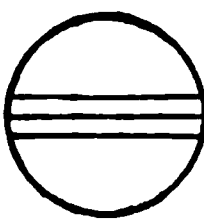
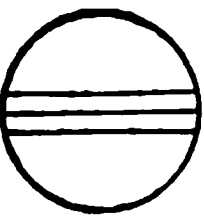
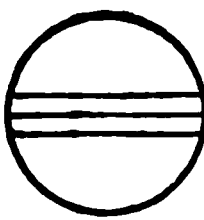
BER.

NOTE.—*In.* denotes ingress. *Eg.*, egress. *Dis.*, disappearance; *Re.*, reappearance; *Ec.*, eclipse.
Oc. denotes occultation; *Tr.*, transit of the satellite; *Sh.*, transit of the shadow; * Visible at Washington.
(Rph 13)

WASHINGTON MEAN TIME.

SEPTEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		* r	III.		* d	* r
II.		* r	IV.		* d	* r

Configurations at 9^h 0^m for an Inverting Telescope.

Day.	West.			East.		
1		1°	3°	○	4°	
2		3°	2°	○	1°	4°
3		3°	1°	2°	○	4°
4		3°		○	1°	2°
5			12°	○	3°	4°
6	○ 1°		2°	○	3°	4°
7	.			○	2°	3°
8			1°	○	3°	4°
9		3°	2°	4°	○	1°
10		3°	4°	1°	2°	○
11		4°		3°	○	1°
12	○ 2°	4°		1°	○	3°
13		4°		2°	○ 1°	3°
14		4°			○	2°
15			4°	1°	○	3°
16			4°	3°	2°	○
17		3°		1°	2°	4°
18			3°		○	1°
19			1°	○	2°	4°
20		2°		○	1°	3°
21			1°	○	3°	4°
22	○ 1°			○	3°	2°
23			3°	2°	○	1°
24		3°		21°	○	4°
25			3°		○	4°
26			1°	4°	○	2°
27		4°	2°		○	1°
28		4°		1°	○	3°
29	○ 1°	4°			○	3°
30		4°		3°	2°	○

SATELLITES OF JUPITER, 1913.

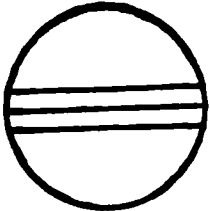
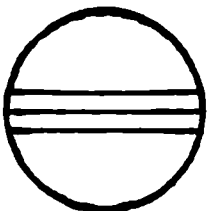
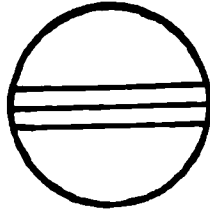
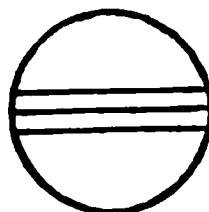
MEAN TIME.

NOTE.—*In.* denotes ingress; *Eg.*, egress; *Dis.*, disappearance; *Re.*, reappearance; *Ec.*, eclipse.
Oc. denotes occultation; *Tr.*, transit of the satellite; *Sh.*, transit of the shadow; * Visible at Washington.
 [Eph 13]

WASHINGTON MEAN TIME.

OCTOBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		* r	III.		* d	* r
II.		* r	IV.		* d	* r

Configurations at 7^h 30^m for an Inverting Telescope.

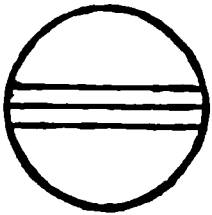
Day.	West.					East.				
1		4	3	2	1	○				
2			4	3		○	2	1		
3				4	1	○	3	2		
4				2		○	1	3		4 ●
5				1	2	○		4	3	
6						○	1	3	2	4
7	○ 2			3	1	○			4	
8			3	2	1	○			4	
9			3			○	1	2		4
10				1	3	○	2		4	
11				2		○	1	3	4	
12				1	2	○	4		3	
13				4		○	1	2	3	
14	○ 3		4		1	○ 2				
15	○ 1	4		3	2	○				
16		4	3			○				1 ● 2 ●
17		4		3	1	○	2			
18		4		2		○	3	1		
19			4	1	2	○			3	
20				4		○	1	2	3	
21				1		○ 3	4			
22			3	2		○ 1		4		
23			3			○		4		1 ● 2 ●
24				3	1	○	2		4	
25				2		○	1		4	3 ●
26				2	1	○		3	4	
27						○	1	2	3	4
28				1		○	3	2	4	
29				2	3	○	4	1		
30			3	4	2	○				
31	○ 1	4		3		○	2			

WASHINGTON MEAN TIME.

NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

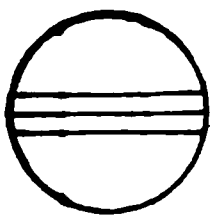
I.



*

r

III.



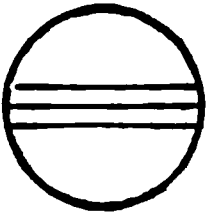
*

d

*

r

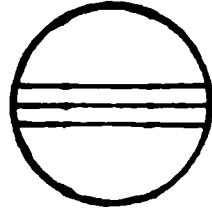
II.



*

r

IV.



*

d

*

r

Configurations at 6^h 30^m for an Inverting Telescope.

Day.	West.			East.		
1	4°	2°	○ 1°			3° ●
2	4°	2°	1° ○	3°		
3	4°		○ 1°	3°		
4	4°	1°	○ 2°	3°		
5	4°	2° 3°	○ 1°			
6	3°	4° 1°	○			
7	3°		○ 1°	2°		4° ●
8	○ 2°	3°	○	4°		1° ●
9		2°	1° ○	3°	4°	
10			○ 2° 1°	3°	4°	
11		1°	○ 2°	3°	4°	
12		2° 3°	○ 1°		4°	
13	3°	1°	○		4°	
14	3°		○ 1°	4°		
15	○ 4°	3° 1°	○ 2°			
16		4°	1° ○	3°		
17	4°		○ 1°	3°		2° ●
18	4°	1°	○ 2° 3°			
19	4°	2° 3°	○ 1°			
20	4°	3°	2° 1° ○			
21	4°	3°	○ 1° 2°			
22		4° 3°	1° ○ 2°			
23	○ 1°	2°	4° ○	3°		
24			○ 1° 4°	3°		2° ●
25		1°	○ 2° 3° 4°			
26		2°	○ 3° 1°		4°	
27		3° 2° 1°	○		4°	
28		3°	○ 1° 2°		4°	
29		3° 1°	○ 2°		4°	
30		2°	○ 1° 3°		4°	

d	h	m	s				d	h	m	s				d	h	m	s						
1	5	16			I.*	Oc.	Dis.	7	10	6			I.	Tr.	In.	18	22	20			II.	Tr.	Eg.
	8	21	45		I.	Ec.	Re.		10	50			I.	Sh.	In.		23	36			II.	Sh.	Eg.
	8	50			II.	Oc.	Dis.		12	25			I.	Tr.	Eg.	14	5	44			III.*	Oc.	Dis.
	13	21	0		II.	Ec.	Re.		13	9			I.	Sh.	Eg.		11	42	44		III.	Ec.	Re.
2	1	18			IV.	Tr.	In.	8	7	17			I.	Oc.	Dis.		12	8			I.	Tr.	In.
	2	35			I.	Tr.	In.		10	16	34		I.	Ec.	Re.		12	45			I.	Sh.	In.
	3	23			I.	Sh.	In.		11	40			II.	Oc.	Dis.		14	27			I.	Tr.	Eg.
	4	54			I.	Tr.	Eg.		15	58	45		II.	Ec.	Re.		15	5			I.	Sh.	Eg.
	5	3			IV.	Tr.	Eg.	9	4	36			I.	Tr.	In.	15	9	18			I.	Oc.	Dis.
	5	43			I.*	Sh.	Eg.		5	19			I.*	Sh.	In.		12	11	21		I.	Ec.	Re.
	8	56			IV.	Sh.	In.		6	55			I.	Tr.	Eg.		14	32			II.	Oc.	Dis.
	13	1			IV.	Sh.	Eg.		7	38			I.	Sh.	Eg.		18	36	19		II.	Ec.	Re.
	23	46			I.	Oc.	Dis.	10	1	47			I.	Oc.	Dis.	16	6	38			I.	Tr.	In.
3	2	50	27		I.	Ec.	Re.		4	45	15		I.	Ec.	Re.		7	14			I.	Sh.	In.
	3	15			II.	Tr.	In.		6	3			II.*	Tr.	In.		8	57			I.	Tr.	Eg.
	4	49			II.	Sh.	In.		7	25			II.	Sh.	In.		9	33			I.	Sh.	Eg.
	6	7			II.*	Tr.	Eg.		8	56			II.	Tr.	Eg.	17	3	48			I.	Oc.	Dis.
	7	42			II.	Sh.	Eg.		10	18			II.	Sh.	Eg.		6	40	1		I.	Ec.	Re.
	10	58			III.	Tr.	In.		11	44			IV.	Oc.	Dis.		8	52			II.	Tr.	In.
	14	8			III.	Sh.	In.		15	24			III.	Tr.	In.		10	0			II.	Sh.	In.
	14	26			III.	Tr.	Eg.		15	34			IV.	Oc.	Re.		11	44			II.	Tr.	Eg.
	17	41			III.	Sh.	Eg.		18	2	11		IV.	Ec.	Dis.		12	53			II.	Sh.	Eg.
	21	5			I.	Tr.	In.		18	8			III.	Sh.	In.		19	52			III.	Tr.	In.
	21	52			I.	Sh.	In.		18	53			III.	Tr.	Eg.		22	8			III.	Sh.	In.
	23	24			I.	Tr.	Eg.		21	42			III.	Sh.	Eg.		23	22			III.	Tr.	Eg.
4	0	12			I.	Sh.	Eg.		22	2	51		IV.	Ec.	Re.	18	1	9			I.	Tr.	In.
	18	16			I.	Oc.	Dis.		23	7			I.	Tr.	In.		1	42			III.	Sh.	Eg.
	21	19	12		I.	Ec.	Re.		23	47			I.	Sh.	In.		1	43			I.	Sh.	In.
	22	16			II.	Oc.	Dis.	11	1	26			I.	Tr.	Eg.		3	28			I.	Tr.	Eg.
5	2	40	22		II.	Ec.	Re.		2	7			I.	Sh.	Eg.								

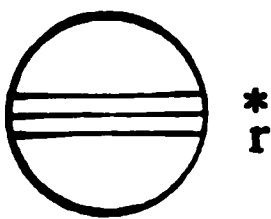
[Eph 13]

WASHINGTON MEAN TIME.

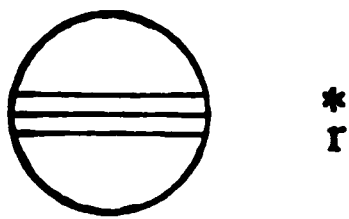
DECEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.

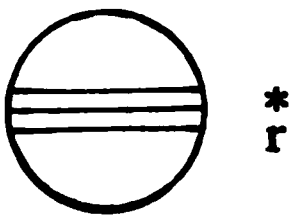
I.



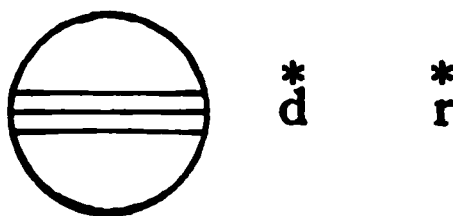
III.



II.



IV.



Configurations at 5^h 45^m for an Inverting Telescope.

Day.	West.			East.		
1			2 ^o ○	4 ^o	3 ^o	1 ^o ●
2			1 ^o 4 ^o ○	2 ^o	3 ^o	
3	○ 2 ^o		4 ^o	○ 3 ^o 1 ^o		
4		4 ^o	3 ^o 2 ^o 1 ^o	○		
5		4 ^o	3 ^o	○ 2 ^o 1 ^o		
6		4 ^o	3 ^o 1 ^o	○ 2 ^o		
7		4 ^o	2 ^o	○ 1 ^o		3 ^o ●
8		4 ^o	2 ^o 1 ^o	○ 3 ^o		
9	○ 1 ^o		4 ^o	○ 2 ^o 3 ^o		
10			4 ^o ○ 2 ^o 1 ^o 3 ^o			
11			2 ^o 3 ^o 1 ^o	○ 4 ^o		
12		3 ^o		○ 2 ^o 1 ^o	4 ^o	
13		3 ^o	1 ^o	○ 2 ^o	4 ^o	
14		2 ^o		○ 1 ^o	4 ^o	3 ^o ●
15		2 ^o 1 ^o		○ 3 ^o	4 ^o	
16			○ 1 ^o	2 ^o	3 ^o	4 ^o
17			○ 2 ^o	3 ^o	4 ^o	1 ^o ●
18		2 ^o	3 ^o 1 ^o	○ 4 ^o		
19		3 ^o	4 ^o ○	1 ^o		2 ^o ●

[Eph 13]

656 MAGNITUDE AND RINGS OF SATURN, 1913.

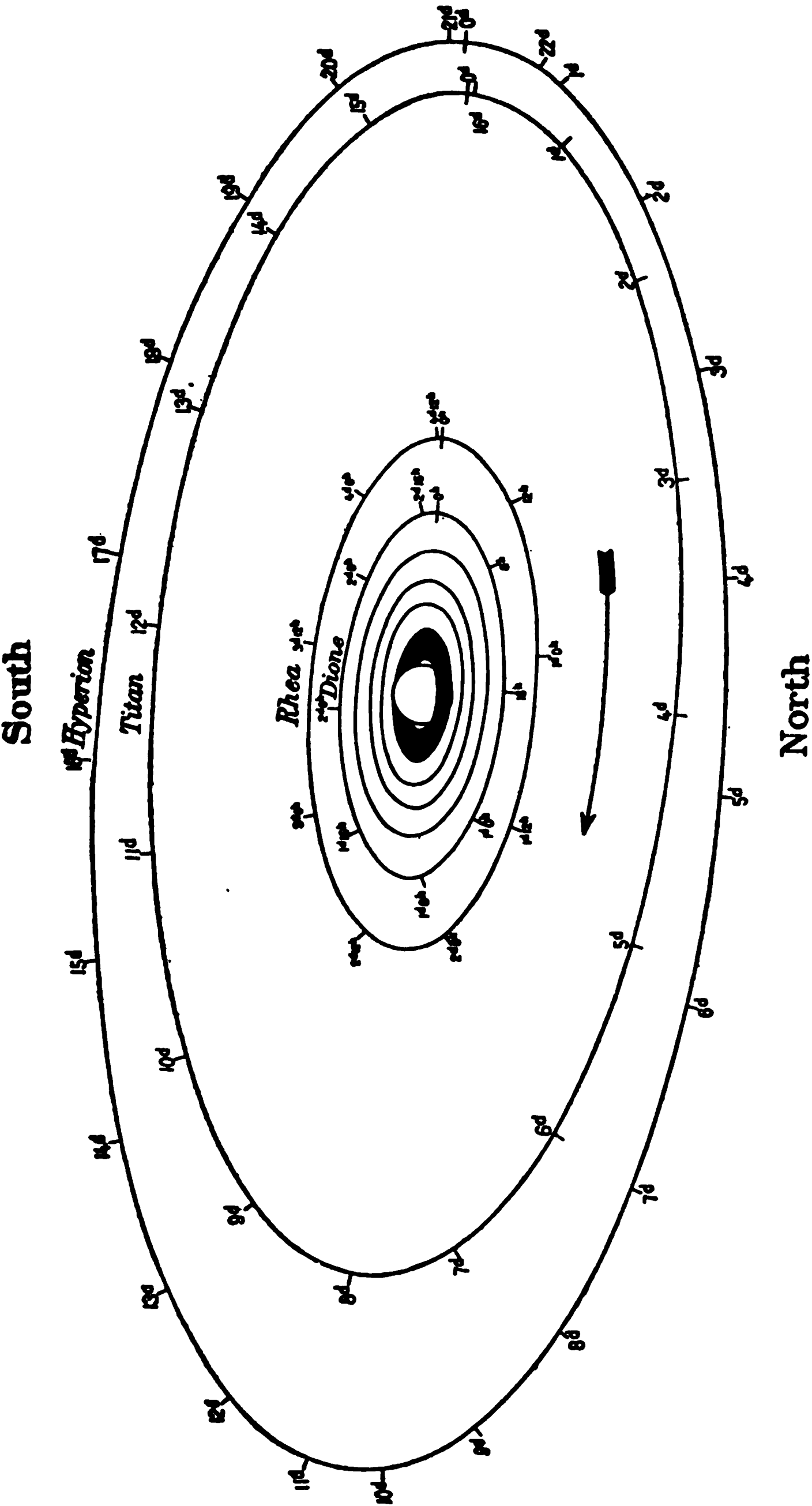
ELEMENTS FOR DETERMINING THE GEOCENTRIC POSITION, APPEARANCE, AND MAGNITUDE OF SATURN'S RINGS.

Washington Mean Noon.		a Outer Major Axis.	b Outer Minor Axis.	p Inclination of Northern Semi-minor Axis to Circle of Declination from North to East.	l The Eleva- tion of the Earth above the Plane of the Rings.	l' The Eleva- tion of the Sun above the Plane of the Rings.	u u'		Stellar Mag.	
							Earth's Longitude from Saturn counted on Plane of Rings from the Rings' Ascending Node on—			
							Equator.	Ecliptic.		
		°	'	°	'	°	'	°	'	
Jan.	0	45.10	-18.42	-2 28.3	-24 6.8	-24 57.7	110 5.5	67 34.2	0.0	
	10	44.45	18.13	2 25.0	24 4.8	25 1.5	109 38.0	67 6.8	+0.1	
	20	43.72	17.84	2 23.0	24 4.7	25 5.2	109 21.7	66 50.5	0.2	
	30	42.95	17.55	2 22.6	24 6.8	25 8.8	109 17.3	66 46.2	0.2	
Feb.	9	42.17	17.27	2 23.5	24 11.1	25 12.5	109 25.2	66 54.1	0.3	
Mar.	19	41.39	-17.03	-2 26.0	-24 17.3	-25 16.0	109 45.0	67 14.0	+0.3	
	1	40.65	16.81	2 29.8	24 25.2	25 19.5	110 16.4	67 45.5	0.3	
	11	39.96	16.62	2 34.9	24 34.6	25 22.9	110 58.3	68 27.5	0.4	
	21	39.34	16.47	2 41.2	24 45.0	25 26.2	111 49.9	69 19.1	0.4	
	31	38.79	16.35	2 48.4	24 56.1	25 29.4	112 49.9	70 19.2	0.4	
Apr.	10	38.32	-16.27	-2 56.4	-25 7.6	-25 32.6	113 57.3	71 26.6	+0.4	
	20	37.93	16.22	3 5.2	25 19.0	25 35.8	115 10.8	72 40.2	0.3	
	30	37.63	16.20	3 14.4	25 30.1	25 38.8	116 29.3	73 58.7	0.3	
May	10	37.42	16.21	3 24.0	25 40.6	25 41.9	117 51.4	75 20.9	0.3	
	20	37.30	16.25	3 33.8	25 50.2	25 44.8	119 16.1	76 45.6	0.3	
June	30	37.27	-16.32	-3 43.6	-25 58.9	-25 47.7	120 42.0	78 11.6	+0.2	
	9	37.32	16.42	3 53.2	26 6.4	25 50.4	122 8.0	79 37.6	0.3	
	19	37.46	16.55	4 2.6	26 12.7	25 53.2	123 33.0	81 2.6	0.3	
	29	37.69	16.70	4 11.7	26 17.8	25 55.8	124 55.6	82 25.2	0.3	
July	9	38.00	16.88	4 20.2	26 21.7	25 58.4	126 14.7	83 44.4	0.3	
Aug.	19	38.40	-17.08	-4 28.0	-26 24.5	-26 1.0	127 29.1	84 58.9	+0.3	
	29	38.88	17.31	4 35.2	26 26.2	26 3.5	128 37.6	86 7.5	0.3	
	8	39.44	17.56	4 41.4	26 27.1	26 5.9	129 39.1	87 9.0	0.3	
	18	40.07	17.84	4 46.8	26 27.2	26 8.2	130 32.2	88 2.2	0.3	
	28	40.75	18.15	4 51.1	26 26.7	26 10.5	131 16.0	88 46.0	0.3	
Sept.	7	41.49	-18.47	-4 54.4	-26 25.9	-26 12.6	131 49.3	89 19.3	+0.2	
	17	42.26	18.80	4 56.5	26 24.9	26 14.7	132 11.3	89 41.4	0.2	
	27	43.05	19.14	4 57.5	26 23.8	26 16.8	132 21.3	89 51.5	0.2	
Oct.	7	43.82	19.47	4 57.2	26 22.8	26 18.9	132 19.1	89 49.3	+0.1	
	17	44.56	19.79	4 55.7	26 21.8	26 20.7	132 4.6	89 34.8	0.0	
Nov.	27	45.23	-20.07	-4 53.1	-26 21.0	-26 22.4	131 38.5	89 8.8	0.0	
	6	45.79	20.31	4 49.5	26 20.2	26 24.2	131 2.0	88 32.3	-0.1	
	16	46.23	20.50	4 45.0	26 19.4	26 25.9	130 16.9	87 47.3	0.2	
	26	46.50	20.61	4 39.8	26 18.6	26 27.5	129 25.6	86 56.1	0.2	
Dec.	6	46.61	20.65	4 34.2	26 17.9	26 29.1	128 31.0	86 1.5	0.2	
	16	46.53	-20.60	-4 28.5	-26 17.2	-26 30.6	127 36.2	85 6.8	-0.2	
	26	46.27	20.48	4 23.0	26 16.5	26 32.0	126 44.2	84 14.8	0.2	
	31	46.07	-20.39	-4 20.5	-26 16.3	-26 32.6	126 20.3	83 50.9	-0.2	

The factor to be multiplied by a and b to obtain the axes of—

The inner ellipse of the outer ring =0.8801,	log factor =9.9445
The outer ellipse of the inner ring =0.8599,	log factor =9.9344
The inner ellipse of the inner ring =0.6650,	log factor =9.8228
The inner ellipse of the dusky ring =0.5486,	log factor =9.7392

NOTE.—The negative sign of l indicates that the visible surface of the rings is the southern one.



MEAN SYNODIC PERIODS.		
	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.6
VIII.	79	22.1
IX.	580	2.9

APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN,
AT DATE OF OPPOSITION, DECEMBER 6, 1913.
AS SEEN IN AN INVERTING TELESCOPE.

NAMES OF THE SATELLITES.	
I.	Mimas.
II.	Enceladus.
III.	Tethys.
IV.	Dione.
V.	Rhea.
VI.	Titan.
VII.	Hyperion.
VIII.	Iapetus.
IX.	Phœbe.

WASHINGTON MEAN TIME OF GREATEST ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked “o” are those of the eastern elongation, as seen in an inverting telescope. The times of these elongations may be found from the following tables, and the apparent position of a satellite at any other time may be marked on the diagram by setting off on the proper orbit the elapsed interval in days and hours since the last eastern elongation. The orbits of the five inner satellites are regarded as circular, and the time of any elongation not given in the tables may be readily found from those given by adding or subtracting the proper multiple of the mean synodic period. Mimas can be seen only within a few hours of each elongation, and the time of every elongation visible at Washington is given. For the three outer satellites the eccentricity is taken into account, and the times both of the elongations and of the conjunctions are given. The following abbreviations are used in the tables:

- E., East Elongation.
W., West Elongation.
- I., Inferior Conjunction (north of planet).
S., Superior Conjunction (south of planet).

MIMAS.

Greatest Elongations Visible at Washington.

Jan.	d h	Jan.	d h	Oct.	d h	Nov.	d h	Nov.	d h	Dec.	d h
	2 14.6 E.		30 9.8 W.		2 12.0 W.		1 15.6 W.		24 6.3 W.		12 15.2 E.
	3 13.2 E.		31 8.4 W.		3 10.6 W.		2 14.2 W.		24 17.5 E.		13 13.8 E.
	4 11.8 E.	Feb.	1 7.0 W.		7 16.2 E.		3 12.8 W.		25 16.1 E.		14 12.4 E.
	5 10.4 E.		5 12.9 E.		8 14.8 E.		4 11.5 W.		26 14.7 E.		15 11.0 E.
	6 9.0 E.		6 11.5 E.		9 13.4 E.		5 10.1 W.		27 13.4 E.		16 9.6 E.
	7 7.7 E.		7 10.1 E.		10 12.1 E.		6 8.7 W.		28 12.0 E.		17 8.2 E.
	8 6.3 E.		8 8.7 E.		11 10.7 E.		8 17.1 E.		29 10.6 E.		18 6.8 E.
	10 14.8 W.		9 7.4 E.		12 9.3 E.		9 15.7 E.		30 9.2 E.		19 5.4 E.
	11 13.4 W.		14 11.7 W.		15 16.6 W.		10 14.3 E.	Dec.	1 7.8 E.		19 16.8 W.
	12 12.0 W.		15 10.3 W.		16 15.2 W.		11 12.9 E.		2 6.4 E.		20 15.4 W.
	13 10.7 W.		16 8.9 W.		17 13.8 W.		12 11.6 E.		2 17.8 W.		21 14.0 W.
	14 9.3 W.		17 7.6 W.		18 12.4 W.		13 10.2 E.		3 16.4 W.		22 12.6 W.
	15 7.9 W.		. . . . .		19 11.0 W.		14 8.8 E.		4 15.0 W.		23 11.3 W.
	16 6.5 W.	Sept.	20 17.2 E.		20 9.7 W.		15 7.4 E.		5 13.6 W.		24 9.9 W.
	19 13.7 E.		21 15.8 E.		23 16.7 E.		16 17.4 W.		6 12.3 W.		25 8.5 W.
	20 12.3 E.		22 14.4 E.		24 15.3 E.		17 16.0 W.		7 10.9 W.		26 7.1 W.
	21 11.0 E.		23 13.0 E.		25 13.9 E.		18 14.6 W.		8 9.5 W.		27 5.7 W.
	22 9.6 E.		24 11.6 E.		26 12.5 E.		19 13.3 W.		9 8.1 W.		27 17.0 E.
	23 8.2 E.		25 10.2 E.		27 11.1 E.		20 11.9 W.		10 6.7 W.		28 15.6 E.
	24 6.8 E.		29 16.1 W.		28 9.7 E.		21 10.5 W.		10 17.9 E.		29 14.2 E.
	28 12.5 W.		30 14.7 W.		29 8.4 E.		22 9.1 W.		11 5.3 W.		30 12.8 E.
	29 11.2 W.	Oct.	1 13.3 W.		31 17.0 W.		23 7.7 W.		11 16.5 E.		31 11.4 E.

ENCELADUS.

Jan.	d h	Jan.	d h	Jan.	d h	Feb.	d h	Feb.	d h	Mar.	d h
	2 5.2 E.		15 22.0 E.		29 14.9 E.		12 7.8 E.		26 0.8 E.		11 17.7 E.
	3 14.1 E.		17 6.9 E.		30 23.8 E.		13 16.7 E.		27 9.7 E.		. . . . .
	4 23.0 E.		18 15.8 E.	Feb.	1 8.7 E.		15 1.6 E.		28 18.6 E.	Aug.	20 12.0 E.
	6 7.9 E.		20 0.7 E.		2 17.6 E.		16 10.5 E.	Mar.	2 3.5 E.		21 20.9 E.
	7 16.8 E.		21 9.6 E.		4 2.5 E.		17 19.4 E.		3 12.4 E.		23 5.8 E.
	9 1.6 E.		22 18.5 E.		5 11.4 E.		19 4.3 E.		4 21.2 E.		24 14.7 E.
	10 10.5 E.		24 3.4 E.		6 20.3 E.		20 13.2 E.		6 6.1 E.		25 23.6 E.
	11 19.4 E.		25 12.3 E.		8 5.2 E.		21 22.1 E.		7 15.0 E.		27 8.5 E.
	13 4.3 E.		26 21.2 E.		9 14.1 E.		23 7.0 E.		8 23.9 E.		28 17.4 E.
	14 13.2 E.		28 6.1 E.		10 23.0 E.		24 15.9 E.		10 8.8 E.		30 2.2 E.

SATELLITES OF SATURN, 1913.

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WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ENCELADUS—(Concluded).

Aug 31 11.1 E.	Sept. 21 0.4 E.	Oct. 11 13.7 E.	Nov. 1 2.8 E.	Nov. 21 15.9 E.	Dec. 12 5.0 E.
Sept. 1 20.0 E.	22 9.3 E.	12 22.6 E.	2 11.7 E.	23 0.8 E.	13 13.9 E.
3 4.9 E.	23 18.2 E.	14 7.5 E.	3 20.6 E.	24 9.7 E.	14 22.8 E.
4 13.8 E.	25 3.1 E.	15 16.4 E.	5 5.5 E.	25 18.6 E.	16 7.7 E.
5 22.7 E.	26 12.0 E.	17 1.2 E.	6 14.3 E.	27 3.4 E.	17 16.5 E.
7 7.6 E.	27 20.9 E.	18 10.0 E.	7 23.2 E.	28 12.3 E.	19 1.4 E.
8 16.5 E.	29 5.8 E.	19 18.9 E.	9 8.1 E.	29 21.2 E.	20 10.3 E.
10 1.4 E.	30 14.7 E.	21 3.8 E.	10 17.0 E.	Dec. 1 6.1 E.	21 19.2 E.
11 10.3 E.	Oct. 1 23.6 E.	22 12.7 E.	12 1.9 E.	2 15.0 E.	23 4.1 E.
12 19.1 E.	3 8.4 E.	23 21.5 E.	13 10.7 E.	3 23.8 E.	24 12.9 E.
14 4.0 E.	4 17.3 E.	25 6.4 E.	14 19.5 E.	5 8.6 E.	25 21.8 E.
15 12.9 E.	6 2.2 E.	26 15.3 E.	16 4.4 E.	6 17.5 E.	27 6.6 E.
16 21.8 E.	7 11.1 E.	28 0.2 E.	17 13.3 E.	8 2.4 E.	28 15.5 E.
18 6.7 E.	8 20.0 E.	29 9.1 E.	18 22.1 E.	9 11.3 E.	30 0.4 E.
19 15.5 E.	10 4.8 E.	30 17.9 E.	20 7.0 E.	10 20.1 E.	31 9.3 E.

TETHYS.

Jan. 2 8.2 E.	Feb. 7 5.0 E.	Mar. 15 2.2 E.	Sept. 16 4.9 E.	Oct. 22 1.6 E.	Nov. 26 22.1 E.
4 5.5 E.	9 2.3 E.	16 23.5 E.	18 2.2 E.	23 22.9 E.	28 19.4 E.
6 2.8 E.	10 23.6 E.	Aug.	19 23.5 E.	25 20.2 E.	30 16.7 E.
8 0.1 E.	12 20.9 E.	Aug. 16 23.8 E.	21 20.8 E.	27 17.5 E.	Dec. 2 14.0 E.
9 21.4 E.	14 18.3 E.	18 21.2 E.	23 18.1 E.	29 14.8 E.	4 11.2 E.
11 18.7 E.	16 15.6 E.	20 18.5 E.	25 15.4 E.	31 12.1 E.	6 8.5 E.
13 16.0 E.	18 12.9 E.	22 15.8 E.	27 12.7 E.	Nov. 2 9.4 E.	8 5.8 E.
15 13.3 E.	20 10.2 E.	24 13.1 E.	29 10.0 E.	4 6.7 E.	10 3.1 E.
17 10.6 E.	22 7.6 E.	26 10.4 E.	Oct. 1 7.3 E.	6 4.0 E.	12 0.4 E.
19 7.9 E.	24 4.9 E.	28 7.8 E.	3 4.6 E.	8 1.2 E.	13 21.7 E.
21 5.2 E.	26 2.2 E.	30 5.1 E.	5 1.9 E.	9 22.5 E.	15 19.0 E.
23 2.5 E.	27 23.5 E.	Sept. 1 2.4 E.	6 23.2 E.	11 19.8 E.	17 16.3 E.
24 23.8 E.	Mar. 1 20.9 E.	2 23.7 E.	8 20.5 E.	13 17.1 E.	19 13.6 E.
26 21.1 E.	3 18.2 E.	4 21.0 E.	10 17.8 E.	15 14.4 E.	21 10.8 E.
28 18.4 E.	5 15.5 E.	6 18.3 E.	12 15.2 E.	17 11.7 E.	23 8.1 E.
30 15.7 E.	7 12.8 E.	8 15.6 E.	14 12.5 E.	19 9.0 E.	25 5.4 E.
Feb. 1 13.0 E.	9 10.2 E.	10 13.0 E.	16 9.8 E.	21 6.2 E.	27 2.7 E.
3 10.4 E.	11 7.5 E.	12 10.3 E.	18 7.0 E.	23 3.5 E.	29 0.0 E.
5 7.7 E.	13 4.8 E.	14 7.6 E.	20 4.3 E.	25 0.8 E.	30 21.3 E.

DIONE.

Jan. 2 18.5 E.	Feb. 7 8.4 E.	Mar. 14 22.7 E.	Sept. 17 5.1 E.	Oct. 22 18.9 E.	Nov. 27 8.3 E.
5 12.1 E.	10 2.1 E.	17 16.4 E.	19 22.8 E.	25 12.5 E.	30 1.9 E.
8 5.8 E.	12 19.8 E.	20 10.2 E.	22 16.5 E.	28 6.2 E.	Dec. 2 19.6 E.
10 23.5 E.	15 13.5 E.	Aug.	25 10.2 E.	30 23.8 E.	5 13.2 E.
13 17.2 E.	18 7.2 E.	Aug. 23 13.8 E.	28 3.8 E.	Nov. 2 17.5 E.	8 6.8 E.
16 10.8 E.	21 0.9 E.	26 7.5 E.	30 21.5 E.	5 11.2 E.	11 0.5 E.
19 4.5 E.	23 18.6 E.	29 1.2 E.	Oct. 3 15.2 E.	8 4.8 E.	13 18.1 E.
21 22.2 E.	26 12.4 E.	31 18.9 E.	6 8.9 E.	10 22.4 E.	16 11.8 E.
24 15.9 E.	Mar. 1 6.1 E.	Sept. 3 12.6 E.	9 2.6 E.	13 16.1 E.	19 5.4 E.
27 9.6 E.	3 23.8 E.	6 6.3 E.	11 20.2 E.	16 9.7 E.	21 23.1 E.
30 3.3 E.	6 17.5 E.	9 0.0 E.	14 13.9 E.	19 3.4 E.	24 16.7 E.
Feb. 1 21.0 E.	9 11.2 E.	11 17.7 E.	17 7.6 E.	21 21.0 E.	27 10.4 E.
4 14.7 E.	12 5.0 E.	14 11.4 E.	20 1.2 E.	24 14.7 E.	30 4.0 E.

[Eph 13]

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

RHEA.			TITAN.			HYPERION.			
	d	h		d	h		d		
Jan.	4	19.1 E.	Sept.	24	2.3 E.	Jan.	5.6 W.	Sept.	8.2 E.
	9	7.5 E.		28	14.8 E.		11.6 S.		12.9 I.
	13	19.9 E.	Oct.	3	3.2 E.		16.7 E.		18.7 W.
	18	8.3 E.		7	15.6 E.		21.4 I.		24.6 S.
	22	20.7 E.		12	4.0 E.		26.9 W.		29.4 E.
	27	9.1 E.		16	16.3 E.			Oct.	4.1 I.
	31	21.6 E.		21	4.7 E.				9.9 W.
Feb.	5	10.0 E.		25	17.0 E.	Nov.	1 23.1 I.		15.8 S.
	9	22.5 E.		30	5.4 E.		5 19.5 W.		20.6 E.
	14	10.9 E.	Nov.	3	17.7 E.		9 18.1 S.		25.2 I.
	18	23.4 E.		8	6.0 E.		13 20.5 E.		31.0 W.
	23	11.9 E.		12	18.3 E.		17 20.6 I.	Mar	5.0 I.
	28	0.4 E.		17	6.6 E.		21 16.8 W.		10.6 W.
Mar.	4	12.9 E.		21	18.9 E.		25 15.4 S.		16.5 S.
	9	1.5 E.		26	7.2 E.		29 17.7 E.		21.6 E.
				30	19.5 E.	Dec.	3 17.8 I.		26.4 I.
Aug.	27	23.6 E.	Dec.	5	7.8 E.		7 14.1 W.		27.1 S.
Sept.	1	12.1 E.		9	20.1 E.		11 12.5 S.	Aug.	13.1 S.
	6	0.5 E.		14	8.4 E.		15 14.9 E.		18.0 E.
	10	13.0 E.		18	20.7 E.		19 15.1 I.		22.6 I.
	15	1.5 E.		23	9.0 E.		23 11.3 W.		28.4 W.
	19	13.9 E.		27	21.4 E.	Oct.	27 9.6 S.	Sept.	3.4 S.
							31 12.1 E.		27.6 I.

IAPETUS.

Jan.	d		Feb.	d		Aug.	d		Sept.	d		Oct.	d		Nov.	d	
	8.9 S.			18.8 I.			20.1 W.			8.5 S.			19.5 I.			26.3 S.	
	29.1 E.		Mar.	10.4 W.						29.0 E.		Nov.	7.5 W.		Dec.	16.3 E.	

NINTH SATELLITE OF SATURN.

DIFFERENTIAL COORDINATES OF PHOEBE FOR 1913.

Washington Mean Noon.	$\alpha_{Ph.} - \alpha_{Sat.}$	$\delta_{Ph.} - \delta_{Sat.}$	Washington Mean Noon.	$\alpha_{Ph.} - \alpha_{Sat.}$	$\delta_{Ph.} - \delta_{Sat.}$	Washington Mean Noon.	$\alpha_{Ph.} - \alpha_{Sat.}$	$\delta_{Ph.} - \delta_{Sat.}$
	m s	' "		m s	' "		m s	' "
Jan. 1	+2 19.1	+11 46	Apr. 7	+0 15.2	+2 45	Sept. 30	-1 24.6	-4 55
5	2 15.5	11 35	11	0 9.1	2 19	Oct. 4	1 19.3	4 48
9	2 11.7	11 22	15	+0 3.0	1 53	8	1 13.6	4 41
13	2 7.8	11 8	19	-0 3.1	+1 28	12	1 7.5	4 33
17	2 3.7	10 52		.	.	16	1 1.1	4 23
21	1 59.3	10 35	July 16	-1 49.8	-4 38	20	0 54.6	4 13
25	1 54.7	10 16	20	1 52.0	4 45	24	0 47.9	4 2
29	1 50.0	9 56	24	1 53.9	4 51	28	0 41.0	3 50
Feb. 2	1 45.3	9 35	28	1 55.4	4 56	Nov. 1	0 33.8	3 36
6	1 40.4	9 14	Aug. 1	1 56.6	5 1	5	0 26.5	3 21
10	1 35.4	8 52	5	1 57.4	5 5	9	0 19.1	3 6
14	1 30.2	8 28	9	1 57.8	5 8	13	0 11.6	2 49
18	1 24.9	8 4	13	1 57.8	5 11	17	-0 4.1	2 31
22	1 19.5	7 40	17	1 57.5	5 13	21	+0 3.4	2 11
26	1 14.1	7 15	21	1 56.7	5 15	25	0 10.9	1 51
Mar. 2	1 8.5	6 48	25	1 55.4	5 16	29	0 18.4	1 30
6	1 2.8	6 21	29	1 53.7	5 16	Dec. 3	0 25.8	1 8
10	0 57.0	5 54	Sept. 2	1 51.5	5 16	7	0 33.1	0 45
14	0 51.2	5 27	6	1 48.8	5 15	11	0 40.3	-0 22
18	0 45.3	5 0	10	1 45.8	5 13	15	0 47.3	+0 2
22	0 39.3	4 32	14	1 42.4	5 11	19	0 54.2	0 26
26	0 33.3	4 5	18	1 38.6	5 8	23	1 0.8	0 51
30	0 27.3	3 38	22	1 34.3	5 4	27	1 7.2	1 16
Apr. 3	+0 21.2	+ 3 11	26	-1 29.6	-5 0	31	+1 13.4	+1 41

FRACTIONS OF THE PERIODS OF REVOLUTION.

Fraction of a Revolution.	Mimas.	Enceladus.	Tethys.	Dione.	Rhea.	Titan.	Fraction of a Revolution.
	h	d h	d h	d h	d h	d h	
0.00	0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0.00
0.02	0.5	0 0.7	0 0.9	0 1.3	0 2.2	0 7.7	0.02
0.04	0.9	0 1.3	0 1.8	0 2.6	0 4.3	0 15.3	0.04
0.06	1.4	0 2.0	0 2.7	0 3.9	0 6.5	0 23.0	0.06
0.08	1.8	0 2.6	0 3.6	0 5.3	0 8.7	1 6.6	0.08
0.10	2.3	0 3.3	0 4.5	0 6.6	0 10.8	1 14.3	0.10
0.12	2.7	0 4.0	0 5.4	0 7.9	0 13.0	1 21.9	0.12
0.14	3.2	0 4.6	0 6.3	0 9.2	0 15.2	2 5.6	0.14
0.16	3.6	0 5.3	0 7.2	0 10.5	0 17.3	2 13.2	0.16
0.18	4.1	0 5.9	0 8.2	0 11.8	0 19.5	2 20.9	0.18
0.20	4.5	0 6.6	0 9.1	0 13.1	0 21.7	3 4.5	0.20
0.22	5.0	0 7.2	0 10.0	0 14.5	0 23.9	3 12.2	0.22
0.24	5.4	0 7.9	0 10.9	0 15.8	1 2.0	3 19.8	0.24
0.26	5.9	0 8.6	0 11.8	0 17.1	1 4.2	4 3.5	0.26
0.28	6.3	0 9.2	0 12.7	0 18.4	1 6.4	4 11.2	0.28
0.30	6.8	0 9.9	0 13.6	0 19.7	1 8.5	4 18.8	0.30
0.32	7.2	0 10.5	0 14.5	0 21.0	1 10.7	5 2.5	0.32
0.34	7.7	0 11.2	0 15.4	0 22.3	1 12.9	5 10.1	0.34
0.36	8.1	0 11.8	0 16.3	0 23.6	1 15.0	5 17.8	0.36
0.38	8.6	0 12.5	0 17.2	1 1.0	1 17.2	6 1.4	0.38
0.40	9.1	0 13.2	0 18.1	1 2.3	1 19.4	6 9.1	0.40
0.42	9.5	0 13.8	0 19.0	1 3.6	1 21.5	6 16.7	0.42
0.44	10.0	0 14.5	0 19.9	1 4.9	1 23.7	7 0.4	0.44
0.46	10.4	0 15.1	0 20.8	1 6.2	2 1.9	7 8.0	0.46
0.48	10.9	0 15.8	0 21.7	1 7.5	2 4.0	7 15.7	0.48
0.50	11.3	0 16.4	0 22.7	1 8.8	2 6.2	7 23.3	0.50
0.52	11.8	0 17.1	0 23.6	1 10.2	2 8.4	8 7.0	0.52
0.54	12.2	0 17.8	1 0.5	1 11.5	2 10.5	8 14.7	0.54
0.56	12.7	0 18.4	1 1.4	1 12.8	2 12.7	8 22.3	0.56
0.58	13.1	0 19.1	1 2.3	1 14.1	2 14.9	9 6.0	0.58
0.60	13.6	0 19.7	1 3.2	1 15.4	2 17.1	9 13.6	0.60
0.62	14.0	0 20.4	1 4.1	1 16.7	2 19.2	9 21.3	0.62
0.64	14.5	0 21.0	1 5.0	1 18.0	2 21.4	10 4.9	0.64
0.66	14.9	0 21.7	1 5.9	1 19.4	2 23.6	10 12.6	0.66
0.68	15.4	0 22.4	1 6.8	1 20.7	3 1.7	10 20.2	0.68
0.70	15.8	0 23.0	1 7.7	1 22.0	3 3.9	11 3.9	0.70
0.72	16.3	0 23.7	1 8.6	1 23.3	3 6.1	11 11.5	0.72
0.74	16.7	1 0.3	1 9.5	2 0.6	3 8.2	11 19.2	0.74
0.76	17.2	1 1.0	1 10.4	2 1.9	3 10.4	12 2.8	0.76
0.78	17.6	1 1.7	1 11.3	2 3.2	3 12.6	12 10.5	0.78
0.80	18.1	1 2.3	1 12.2	2 4.5	3 14.7	12 18.1	0.80
0.82	18.5	1 3.0	1 13.2	2 5.9	3 16.9	13 1.8	0.82
0.84	19.0	1 3.6	1 14.1	2 7.2	3 19.1	13 9.5	0.84
0.86	19.5	1 4.3	1 15.0	2 8.5	3 21.2	13 17.1	0.86
0.88	19.9	1 4.9	1 15.9	2 9.8	3 23.4	14 0.8	0.88
0.90	20.4	1 5.6	1 16.8	2 11.1	4 1.6	14 8.4	0.90
0.92	20.8	1 6.3	1 17.7	2 12.4	4 3.7	14 16.1	0.92
0.94	21.3	1 6.9	1 18.6	2 13.7	4 5.9	14 23.7	0.94
0.96	21.7	1 7.6	1 19.5	2 15.1	4 8.1	15 7.4	0.96
0.98	22.2	1 8.2	1 20.4	2 16.4	4 10.3	15 15.0	0.98
1.00	22.6	1 8.9	1 21.3	2 17.7	4 12.4	15 22.7	1.00

Six Inner Satellites of Saturn.			Hyperion.			Iapetus.		
Fraction of a Revolu- tion.	p'	F	Time from Eastern Elongation.	p'	F	Time from Eastern Elongation.	p'	F
	°		d	°		d	°	
0.00	85.1	1.000	0.0	87.1	0.913	0	76.1	1.028
0.02	81.9	0.994	0.5	82.7	0.902	2	73.9	1.017
0.04	78.7	0.975	1.0	78.0	0.871	4	71.6	0.984
0.06	75.2	0.944	1.5	72.9	0.822	6	69.0	0.930
0.08	71.5	0.902	2.0	67.0	0.756	8	66.1	0.857
0.10	67.4	0.850	2.5	59.7	0.677	10	62.5	0.767
0.12	62.6	0.789	3.0	50.6	0.593	12	57.9	0.662
0.14	57.0	0.723	3.5	38.5	0.513	14	51.5	0.548
0.16	50.3	0.653	4.0	22.3	0.451	16	41.6	0.432
0.18	42.0	0.584	4.5	2.6	0.422	18	24.8	0.327
0.20	31.5	0.521	5.0	342.3	0.435	20	356.7	0.264
0.22	18.5	0.472	5.5	324.6	0.488	22	323.2	0.279
0.24	3.2	0.445	6.0	311.3	0.566	24	299.5	0.362
0.26	347.0	0.445	6.5	301.3	0.654	26	285.8	0.474
0.28	331.8	0.472	7.0	293.8	0.744	28	277.4	0.588
0.30	318.8	0.521	7.5	287.8	0.829	30	271.7	0.697
0.32	308.3	0.584	8.0	282.9	0.905	32	267.5	0.793
0.34	300.0	0.653	8.5	278.7	0.969	34	264.1	0.871
0.36	293.2	0.723	9.0	274.9	1.021	36	261.2	0.928
0.38	287.6	0.789	9.5	271.5	1.058	38	258.6	0.962
0.40	282.9	0.850	10.0	268.3	1.080	40	256.1	0.972
0.42	278.8	0.902	10.5	265.1	1.087	42	253.6	0.958
0.44	275.0	0.944	11.0	262.0	1.078	44	250.9	0.919
0.46	271.6	0.975	11.5	258.8	1.055	46	248.0	0.857
0.48	268.3	0.994	12.0	255.4	1.018	48	244.5	0.774
0.50	265.1	1.000	12.5	251.7	0.967	50	240.0	0.675
0.52	261.9	0.994	13.0	247.4	0.905	52	233.8	0.563
0.54	258.7	0.975	13.5	242.5	0.832	54	224.5	0.445
0.56	255.2	0.944	14.0	236.6	0.753	56	208.7	0.336
0.58	251.5	0.902	14.5	229.3	0.670	58	181.5	0.264
0.60	247.4	0.850	15.0	219.9	0.589	60	146.9	0.271
0.62	242.6	0.789	15.5	207.8	0.517	62	121.6	0.351
0.64	237.0	0.723	16.0	192.3	0.466	64	107.1	0.463
0.66	230.3	0.653	16.5	174.4	0.447	66	98.4	0.582
0.68	222.0	0.584	17.0	156.4	0.463	68	92.7	0.695
0.70	211.5	0.521	17.5	140.4	0.510	70	88.4	0.797
0.72	198.5	0.472	18.0	127.8	0.578	72	85.1	0.883
0.74	183.2	0.445	18.5	118.1	0.654	74	82.4	0.950
0.76	167.0	0.445	19.0	110.4	0.729	76	79.9	0.997
0.78	151.8	0.472	19.5	104.1	0.796	78	77.6	1.023
0.80	138.8	0.521	20.0	98.7	0.852	80	75.4	1.026
0.82	128.3	0.584	20.5	93.8	0.891			
0.84	120.0	0.653	21.0	89.3	0.911			
0.86	113.2	0.723	21.5	84.8	0.910			
0.88	107.6	0.789						
0.90	102.9	0.850						
0.92	98.8	0.902						
0.94	95.0	0.944						
0.96	91.6	0.975						
0.98	88.3	0.994						
1.00	85.1	1.000						

The fraction of a revolution is reckoned from the Eastern Elongation.
Position angle of satellite $p = p' + (P - P_0)$.
Apparent distance of satellite $s = F \frac{a(p)}{p}$.
[Eph 13]

Date.		Mimas.		Enceladus.		Tethys.		Dione.	
		$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$
		°	"	°	"	°	"	°	"
Jan.	1	+1.0	30.7	+2.4	39.4	+3.2	48.8	+2.4	62.5
	11	1.2	30.2	2.5	38.8	3.2	48.0	2.5	61.6
	21	1.5	29.7	2.5	38.2	3.3	47.3	2.5	60.6
	31	1.8	29.2	2.5	37.5	3.2	46.4	2.5	59.5
Feb.	10	2.0	28.7	2.5	36.8	3.2	45.6	2.5	58.4
	20	+2.3	28.2	+2.5	36.2	+3.1	44.7	+2.5	57.3
Mar.	2	2.5	27.6	2.4	35.5	3.0	43.9	2.4	56.3
	12	+2.8	27.2	2.3	34.9	+2.8	43.2	2.3	55.4
Aug.	19	-0.4	27.3	+0.1	35.1	-0.4	43.4	+0.1	55.7
	29	0.8	27.8	0.0	35.7	0.5	44.2	0.0	56.6
Sept.	8	1.2	28.3	0.0	36.4	0.6	45.0	0.0	57.7
	18	1.4	28.8	0.0	37.0	0.7	45.8	0.0	58.8
	28	-1.6	29.4	-0.1	37.7	-0.7	46.7	0.0	59.8
Oct.	8	1.7	29.9	-0.1	38.4	0.8	47.5	0.0	60.9
	18	1.8	30.4	0.0	39.1	0.8	48.3	0.0	61.9
	28	1.8	30.9	0.0	39.6	0.8	49.0	0.0	62.8
Nov.	7	1.7	31.2	+0.1	40.1	0.7	49.6	+0.1	63.6
	17	-1.6	31.5	+0.1	40.5	-0.7	50.1	+0.2	64.2
	27	1.4	31.7	0.2	40.7	0.6	50.4	0.3	64.6
Dec.	7	1.2	31.8	0.3	40.8	0.5	50.5	0.4	64.7
	17	0.9	31.7	0.4	40.7	0.4	50.4	0.4	64.5
	27	-0.6	31.5	+0.5	40.5	-0.4	50.0	+0.5	64.2

Date.		Rhea.		Titan.		Hyperion.		Iapetus.	
		$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$	$P-P_0$	$\frac{a(\rho)}{\rho}$
		°	"	°	"	°	"	°	"
Jan.	1	+2.7	87.3	+2.4	202	+1.9	245	-1.1	589
	11	2.7	86.0	2.4	199	1.9	241	1.1	580
	21	2.8	84.6	2.4	196	2.0	237	1.2	571
	31	2.8	83.1	2.4	193	2.0	233	1.1	561
Feb.	10	2.7	81.6	2.4	189	2.0	229	1.1	551
	20	+2.7	80.1	+2.4	186	+1.9	225	-1.1	541
Mar.	2	2.6	78.7	2.3	182	1.9	221	1.1	531
	12	2.6	77.4	2.2	179	+1.8	217	-1.1	522
Aug.	19	+0.5	77.8	+0.2	180	-0.2	218	+0.2	525
	29	0.4	79.1	0.1	183	0.3	222	0.3	534
Sept.	8	0.3	80.6	0.1	187	0.3	226	0.3	544
	18	0.3	82.0	0.1	190	0.4	230	0.4	554
	28	+0.3	83.6	+0.1	194	-0.4	235	+0.4	564
Oct.	8	0.3	85.1	0.1	197	0.4	239	0.4	574
	18	0.3	86.5	0.1	200	0.3	243	0.4	584
	28	0.3	87.8	0.1	203	0.3	246	0.3	593
Nov.	7	0.4	88.8	0.2	206	0.2	249	0.3	600
	17	+0.5	89.7	+0.2	208	-0.2	252	+0.2	606
	27	0.6	90.2	0.3	209	-0.1	253	+0.1	609
Dec.	7	0.7	90.4	0.4	209	0.0	254	0.0	610
	17	0.8	90.1	0.5	209	+0.1	253	-0.1	609
	27	+0.8	89.6	+0.6	208	+0.2	251	-0.2	605

APPARENT ORBITS OF THE SATELLITES OF URANUS AT DATE OF OPPOSITION,
JULY 28, 1913. AS SEEN IN AN INVERTING TELESCOPE.

South

Apparent Apsides.

Date.	Position Angle.	App. Distances Ariel. Umbriel.
	"	"
May 18,	355.6	13.6 18.9
Aug. 6,	356.8	14.0 19.6
Oct. 25,	357.6	13.4 18.6

Apparent Apsides.

Date.	Position Angle.	App. Distances Titania. Oberon.
	"	"
May 18,	355.6	31.1 41.5
Aug. 6,	356.8	32.1 42.9
Oct. 25,	357.6	30.6 40.8

North

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ARIEL.		UMBRIEL.		TITANIA.		OBERON.
North.	South.	North.	South.	North.	South.	North and South.
d h	d h	d h	d h	d h	d h	d h
May 15 9.0	May 16 15.2	May 1 23.4	May 4 1.1	Apr. 28 1.6	May 2 10.1	May 22 10.0 N.
22 22.4	24 4.7	10 6.3	12 8.0	May 6 18.5	11 3.0	29 3.6 S.
30 11.9	31 18.1	18 13.2	20 14.9	15 11.4	19 19.9	June 4 21.1 N.
June 7 1.3	June 8 7.6	26 20.1	28 21.8	24 4.4	28 12.8	11 14.7 S.
14 14.8	15 21.0	June 4 3.0	June 6 4.8	June 1 21.3	June 6 5.8	18 8.3 N.
22 4.2	23 10.5	12 9.9	14 11.7	10 14.3	14 22.7	25 1.9 S.
29 17.7	July 1 0.0	20 16.9	22 18.6	19 7.2	23 15.7	July 1 19.5 N.
July 7 7.2	8 13.4	28 23.8	July 1 1.5	28 0.2	July 2 8.7	8 13.1 S.
14 20.7	16 2.9	July 7 6.7	9 8.4	July 6 17.2	11 1.6	15 6.7 N.
22 10.1	23 16.4	15 13.7	17 15.4	15 10.1	19 18.6	22 0.3 S.
29 23.6	31 5.9	23 20.6	25 22.3	24 3.1	28 11.6	28 17.9 N.
Aug. 6 13.1	Aug. 7 19.4	Aug. 1 3.5	Aug. 3 5.3	Aug. 1 20.1	Aug. 6 4.6	Aug. 4 11.6 S.
14 2.6	15 8.8	9 10.5	11 12.2	10 13.1	14 21.6	11 5.2 N.
21 16.1	22 22.3	17 17.4	19 19.2	19 6.1	23 14.6	17 22.8 S.
29 5.6	30 11.8	26 0.4	28 2.1	27 23.1	Sept. 1 7.6	24 16.4 N.
Sept. 5 19.0	Sept. 7 1.3	Sept. 3 7.3	Sept. 5 9.1	Sept. 5 16.1	10 0.6	31 10.0 S.
13 8.5	14 14.8	11 14.3	13 16.0	14 9.1	18 17.6	Sept. 7 3.7 N.
20 22.0	22 4.3	19 21.2	21 23.0	23 2.1	27 10.6	13 21.3 S.
28 11.5	29 17.8	28 4.2	30 5.9	Oct. 1 19.0	Oct. 6 3.5	20 14.9 N.
Oct. 6 1.0	Oct. 7 7.2	Oct. 6 11.1	Oct. 8 12.9	10 12.0	14 20.5	27 8.5 S.
13 14.5	14 20.7	14 18.1	16 19.8	19 5.0	23 13.4	Oct. 4 2.0 N.
21 4.0	22 10.2	23 1.0	25 2.7	27 21.9	Nov. 1 6.4	10 19.6 S.
28 17.5	29 23.7	31 7.9	Nov. 2 9.7	Nov. 5 14.9	9 23.3	17 13.2 N.
Nov. 5 6.9	Nov. 6 13.2	Nov. 8 14.9	10 16.6	14 7.8	18 16.3	24 6.8 S.
12 20.4	14 2.7	16 21.8	18 23.5	23 0.7	27 9.2	31 0.3 N.

For Ariel every third elongation is given, and for Umbriel every alternate one; the intermediate ones may be found by adding multiples of the period of the satellite.

Sidereal Period of Ariel, $2^d 12^h.489$; of Umbriel, $4^d 3^h.460$; of Titania, $8^d 16^h.942$; of Oberon, $13^d 11^h.119$.

Fractions of the Period of Revolution.					Fraction of a Revolution.	ρ	F
Fraction of a Revolution.	Ariel.	Umbriel.	Titania.	Oberon.			
	d h	d h	d h	d h		°	
0.00	0 0.0	0 0.0	0 0.0	0 0.0	0.00	356.6	1.000
0.02	0 1.2	0 2.0	0 4.2	0 6.5	0.02	1.3	0.995
0.04	0 2.4	0 4.0	0 8.4	0 12.9	0.04	6.0	0.982
0.06	0 3.6	0 6.0	0 12.5	0 19.4	0.06	11.0	0.960
0.08	0 4.8	0 8.0	0 16.7	1 1.8	0.08	16.2	0.930
0.10	0 6.0	0 10.0	0 20.9	1 8.3	0.10	21.8	0.894
0.12	0 7.3	0 11.9	1 1.1	1 14.8	0.12	27.8	0.852
0.14	0 8.5	0 13.9	1 5.3	1 21.2	0.14	34.6	0.809
0.16	0 9.7	0 15.9	1 9.4	2 3.7	0.16	42.1	0.764
0.18	0 10.9	0 17.9	1 13.6	2 10.2	0.18	50.5	0.723
0.20	0 12.1	0 19.9	1 17.8	2 16.6	0.20	59.9	0.687
0.22	0 13.3	0 21.9	1 22.0	2 23.1	0.22	70.2	0.661
0.24	0 14.5	0 23.9	2 2.1	3 5.5	0.24	81.1	0.647
0.26	0 15.7	1 1.9	2 6.3	3 12.0	0.26	92.2	0.647
0.28	0 16.9	1 3.8	2 10.5	3 18.5	0.28	103.1	0.661
0.30	0 18.1	1 5.8	2 14.7	4 0.9	0.30	113.4	0.687
0.32	0 19.4	1 7.8	2 18.9	4 7.4	0.32	122.8	0.723
0.34	0 20.6	1 9.8	2 23.0	4 13.9	0.34	131.2	0.764
0.36	0 21.8	1 11.8	3 3.2	4 20.3	0.36	138.7	0.809
0.38	0 23.0	1 13.8	3 7.4	5 2.8	0.38	145.4	0.852
0.40	1 0.2	1 15.8	3 11.6	5 9.2	0.40	151.5	0.894
0.42	1 1.4	1 17.8	3 15.8	5 15.7	0.42	157.1	0.930
0.44	1 2.6	1 19.8	3 19.9	5 22.2	0.44	162.3	0.960
0.46	1 3.8	1 21.8	4 0.1	6 4.6	0.46	167.2	0.982
0.48	1 5.0	1 23.7	4 4.3	6 11.1	0.48	172.0	0.995
0.50	1 6.2	2 1.7	4 8.5	6 17.6	0.50	176.6	1.000
0.52	1 7.5	2 3.7	4 12.6	7 0.0	0.52	181.3	0.995
0.54	1 8.7	2 5.7	4 16.8	7 6.5	0.54	186.0	0.982
0.56	1 9.9	2 7.7	4 21.0	7 12.9	0.56	191.0	0.960
0.58	1 11.1	2 9.7	5 1.2	7 19.4	0.58	196.2	0.930
0.60	1 12.3	2 11.7	5 5.4	8 1.9	0.60	201.8	0.894
0.62	1 13.5	2 13.7	5 9.5	8 8.3	0.62	207.8	0.852
0.64	1 14.7	2 15.7	5 13.7	8 14.8	0.64	214.6	0.809
0.66	1 15.9	2 17.6	5 17.9	8 21.3	0.66	222.1	0.764
0.68	1 17.1	2 19.6	5 22.1	9 3.7	0.68	230.5	0.723
0.70	1 18.3	2 21.6	6 2.3	9 10.2	0.70	239.9	0.687
0.72	1 19.6	2 23.6	6 6.4	9 16.6	0.72	250.2	0.661
0.74	1 20.8	3 1.6	6 10.6	9 23.1	0.74	261.1	0.647
0.76	1 22.0	3 3.6	6 14.8	10 5.6	0.76	272.2	0.647
0.78	1 23.2	3 5.6	6 19.0	10 12.0	0.78	283.1	0.661
0.80	2 0.4	3 7.6	6 23.2	10 18.5	0.80	293.4	0.687
0.82	2 1.6	3 9.6	7 3.3	11 1.0	0.82	302.8	0.723
0.84	2 2.8	3 11.5	7 7.5	11 7.4	0.84	311.2	0.764
0.86	2 4.0	3 13.5	7 11.7	11 13.9	0.86	318.7	0.809
0.88	2 5.2	3 15.5	7 15.9	11 20.3	0.88	325.4	0.852
0.90	2 6.4	3 17.5	7 20.0	12 2.8	0.90	331.5	0.894
0.92	2 7.7	3 19.5	8 0.2	12 9.3	0.92	337.1	0.930
0.94	2 8.9	3 21.5	8 4.4	12 15.7	0.94	342.3	0.960
0.96	2 10.1	3 23.5	8 8.6	12 22.2	0.96	347.2	0.982
0.98	2 11.3	4 1.5	8 12.8	13 4.7	0.98	352.0	0.995
1.00	2 12.5	4 3.5	8 16.9	13 11.1	1.00	356.6	1.000

The fraction of a revolution is reckoned from the Northern Elongation.
Position angle of satellite $\rho = \rho^1 + (P - P_0)$.

Apparent distance of satellite $s = F \frac{a(\rho)}{\rho}$.

[Eph 13]

Date.		$P-P_0$	$\frac{a(\rho)}{\rho}$				Date.		$P-P_0$	$\frac{a(\rho)}{\rho}$			
			Ariel.	Umbriel.	Titania.	Oberon.				Ariel.	Umbriel.	Titania.	Oberon.
		°	"	"	"	"			°	"	"	"	"
Mar.	29	-0.6	13.0	18.3	29.8	39.8	July	27	0.0	14.0	19.7	32.1	42.9
Apr.	3	0.7	13.0	18.4	29.9	40.0	Aug.	1	+0.1	14.0	19.7	32.1	42.9
	8	0.8	13.1	18.4	30.0	40.2		6	0.2	14.0	19.7	32.1	42.9
	13	0.8	13.2	18.5	30.1	40.3		11	0.3	14.0	19.7	32.0	42.9
	18	0.9	13.2	18.6	30.3	40.5		16	0.4	14.0	19.6	32.0	42.8
	23	-0.9	13.3	18.7	30.4	40.6		21	+0.5	13.9	19.6	32.0	42.7
	28	1.0	13.3	18.7	30.5	40.8		26	0.6	13.9	19.6	31.9	42.6
May	3	1.0	13.4	18.8	30.6	41.0		31	0.6	13.9	19.5	31.8	42.5
	8	1.0	13.4	18.9	30.8	41.2	Sept.	5	0.7	13.8	19.5	31.7	42.4
	13	1.0	13.5	19.0	30.8	41.3		10	0.8	13.8	19.4	31.6	42.3
	18	-1.0	13.5	19.1	31.0	41.5		15	+0.8	13.7	19.4	31.5	42.2
	23	1.0	13.6	19.1	31.2	41.7		20	0.9	13.7	19.3	31.4	42.0
	28	0.9	13.6	19.2	31.3	41.8		25	0.9	13.7	19.2	31.3	41.9
June	2	0.9	13.7	19.3	31.4	42.0		30	1.0	13.6	19.1	31.2	41.7
	7	0.9	13.7	19.3	31.5	42.1	Oct.	5	1.0	13.5	19.1	31.1	41.5
	12	-0.8	13.8	19.4	31.6	42.3		10	+1.0	13.5	19.0	30.9	41.4
	17	0.7	13.8	19.5	31.7	42.4		15	1.0	13.4	18.9	30.8	41.2
	22	0.6	13.9	19.5	31.8	42.5		20	0.9	13.4	18.8	30.7	41.0
	27	0.6	13.9	19.6	31.9	42.6		25	0.9	13.3	18.8	30.5	40.8
July	2	0.5	13.9	19.6	31.9	42.7		30	0.9	13.3	18.7	30.4	40.7
	7	-0.4	14.0	19.6	32.0	42.8	Nov.	4	+0.8	13.2	18.6	30.3	40.5
	12	0.3	14.0	19.7	32.0	42.8		9	0.8	13.1	18.5	30.1	40.3
	17	0.2	14.0	19.7	32.1	42.9		14	0.8	13.1	18.4	30.0	40.1
	22	-0.1	14.0	19.7	32.1	42.9		19	+0.7	13.0	18.4	29.9	40.0

SATELLITE OF NEPTUNE, 1913.

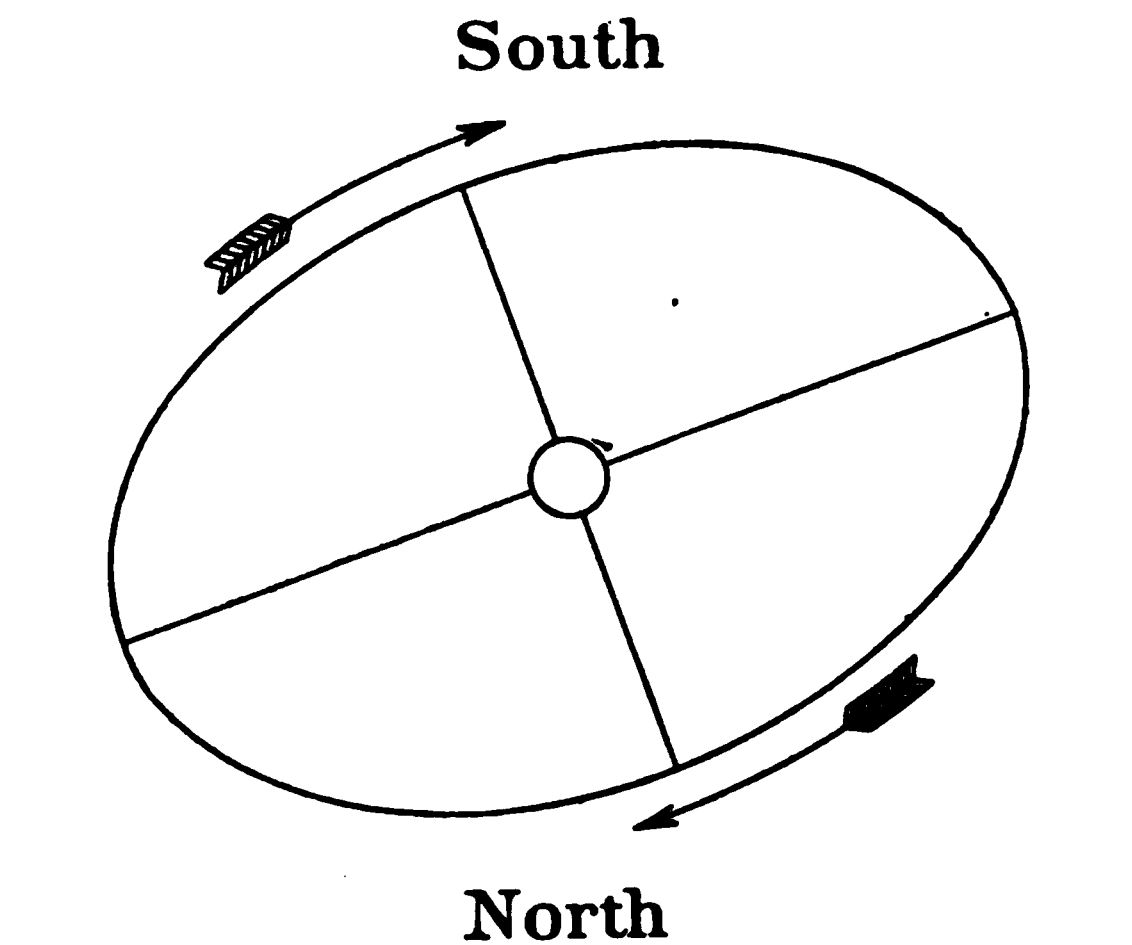
Time from Eastern Elongation.			ρ^1	F	Time from Eastern Elongation.			ρ^1	F	Date.	$P-P_0$	$\frac{a(\rho)}{\rho}$	Date.	$P-P_0$	$\frac{a(\rho)}{\rho}$	
d	h	°			d	h	°					"			"	
0	0	110.0	1.000		3	0	287.6	0.999	Jan.	0	+0.5	16.9	Apr	30	-1.5	16.2
0	3	105.0	0.995		3	3	282.5	0.989		5	0.4	16.9	May	5	1.4	16.1
0	6	99.9	0.980		3	6	277.3	0.969		10	+0.2	16.9		10	1.3	16.1
0	9	94.6	0.955		3	9	271.8	0.940		15	0.0	16.9		15	-1.2	16.0
0	12	88.9	0.922		3	12	265.9	0.904		20	-0.2	16.9	Sept.	26	+3.9	16.1
0	15	82.8	0.883		3	15	259.5	0.862		25	-0.3	16.9	Oct.	1	+4.0	16.1
0	18	76.0	0.839		3	18	252.4	0.816		30	0.5	16.8		6	4.1	16.2
0	21	68.5	0.793		3	21	244.5	0.770	Feb.	4	0.6	16.8		11	4.2	16.2
1	0	60.1	0.748		4	0	235.6	0.727		9	0.8	16.8		16	4.2	16.3
1	3	50.6	0.708		4	3	225.6	0.691		14	1.0	16.8		21	4.3	16.3
1	6	40.1	0.676		4	6	214.6	0.665		19	-1.1	16.8		26	+4.3	16.4
1	9	28.8	0.657		4	9	203.1	0.654		24	1.2	16.7		31	4.3	16.4
1	12	17.1	0.653		4	12	191.4	0.658	Mar.	1	1.3	16.7	Nov.	5	4.3	16.5
1	15	5.6	0.665		4	15	180.1	0.676		6	1.4	16.7		10	4.3	16.5
1	18	354.7	0.690		4	18	169.6	0.707		11	1.5	16.6		15	4.3	16.5
1	21	344.7	0.726		4	21	160.1	0.747		16	-1.6	16.6		20	+4.2	16.6
2	0	335.7	0.770		5	0	151.7	0.792		21	1.7	16.5		25	4.1	16.6
2	3	327.7	0.815		5	3	144.2	0.838		26	1.7	16.5		30	4.1	16.7
2	6	320.6	0.861		5	6	137.4	0.882		31	1.7	16.4	Dec.	5	4.0	16.7
2	9	314.2	0.903		5	9	131.3	0.922	Apr.	5	1.7	16.4		10	3.8	16.7
2	12	308.4	0.940		5	12	125.6	0.955		10	-1.7	16.4		15	+3.7	16.8
2	15	302.9	0.968		5	15	120.3	0.980		15	1.7	16.3		20	3.6	16.8
2	18	297.6	0.988		5	18	115.1	0.995		20	1.6	16.3		25	3.5	16.8
2	21	292.6	0.999		5	21	110.1	1.000		25	-1.6	16.2		30	+3.3	16.9

Position angle of satellite $\rho = \rho^1 + (P - P_0)$.

Apparent distance of satellite $s = F \frac{a(\rho)}{\rho}$.

[Eph 13]

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE AT DATE OF OPPOSITION,
JANUARY 14, 1913, AS SEEN IN AN INVERTING TELESCOPE.



Date.	Position Angle of Apsis.	Apparent Distance at Apsis.
	°	"
Jan. 22,	109.8	16.8
May 2,	108.6	16.1
Oct. 9,	114.2	16.1
Dec. 28,	113.4	16.8

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

East.			West.			East.			West.			East.			West.		
	d	h		d	h		d	h		d	h		d	h		d	h
Jan.	5	12.5	Jan.	8	11.1	Mar.	28	20.1	Mar.	31	18.6	Oct.	14	13.1	Oct.	17	11.6
	11	9.6		14	8.2	Apr.	3	17.1	Apr.	6	15.6		20	10.1		23	8.6
	17	6.8		20	5.3		9	14.2		12	12.7		26	7.2		29	5.7
	23	3.9		26	2.4		15	11.2		18	9.7	Nov.	1	4.2	Nov.	4	2.7
	29	1.0		31	23.6		21	8.2		24	6.8		7	1.2		9	23.7
Feb.	3	22.2	Feb.	6	20.7		27	5.3		30	3.8		12	22.3		15	20.8
	9	19.3		12	17.8	May	3	2.3	May	6	0.8		18	19.3		21	17.8
	15	16.4		18	14.9		8	23.4		11	21.9		24	16.4		27	14.9
	21	13.5		24	12.0		14	20.4		17	18.9		30	13.5	Dec.	3	12.0
	27	10.6	Mar.	2	9.2		20	17.4		23	15.9	Dec.	6	10.6		9	9.1
Mar.	5	7.7		8	6.3		• • • • •			• • • • •		12	7.7		15	6.2	
	11	4.8		14	3.4	Sept.	26	22.2	Sept.	29	20.7		18	4.8		21	3.3
	17	1.9		20	0.5	Oct.	2	19.1	Oct.	5	17.6		24	1.9		27	0.4
	22	23.0		25	21.5		8	16.1		11	14.6		29	23.0		32	21.5

The above times are the instants of each passage of the satellite through the apsis of its apparent orbit. The position of the satellite at any other time may be found by measuring around the orbit from the apsis last passed through, bearing in mind that the radius vector of the satellite describes equal areas in equal times.

The sidereal period of the satellite of Neptune is 5^d 21^h.044.

NOTE.—In the preceding diagrams the central circle represents the planet and is on the same scale as the orbits.

[Eph 13]

PHENOMENA, 1913.

WASHINGTON MEAN TIME.








PLAN

RATIONS.

[Eph 13]

W	MEAN TIME.
PLA	ATIONS.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		° ' "	' "			h m s
1	Abbadia, France .	+43 22 52.2	-11 39.2	69	9.999 313	- 5 1 15.7
2	Adelaide	-34 55 38	+10 56.8	43	9.999 523	+ 9 37 23.92
3	Albany, N. Y. . .	+42 39 12.7	-11 38.0	67	9.999 331	- 0 13 9.0
4	Algiers	+36 47 50	-11 11.3	342	9.999 497	- 5 20 24.33
5	Allegheny, Pa. . .	+40 28 58.0	-11 31.4	384	9.999 409	+ 0 11 49.61
6	Amherst, Mass. . .	+42 21 56.5	-11 37.3	110	9.999 341	- 0 18 9.85
7	Ann Arbor, Mich. .	+42 16 48.0	-11 37.0	285	9.999 355	+ 0 26 39.41
8	Appleton, Wis. . .	+44 15 39	-11 40.1	238	9.999 301	+ 0 45 20.11
9	Arcetri	+43 45 14.6	-11 39.7	184	9.999 310	- 5 53 17.12
10	Arequipa, Peru . .	-16 22 28.0	+ 6 17.8	2452	0.000 051	- 0 22 4.05
11	Armagh, Ireland . .	+54 21 12.7	-11 4.2	61	9.999 033	- 4 41 40.4
12	Athens	+37 58 20.7	-11 18.9	107	9.999 452	- 6 43 8.70
13	Baltimore, Md. . .	+39 17 48	-11 25.5	75	9.999 417	- 0 1 49.8
14	Bamberg, Bavaria.	+49 53 6.0	-11 30.7	300	9.999 161	- 5 51 49.43
15	Barcelona, Spain . .	+41 25 18	-11 34.7	420	9.999 387	- 5 16 43.8
16	Bayswater	-31 55 13	+10 27.8	30	9.999 593	+11 8 6
17	Beloit, Wis. . . .	+42 30 8.4	-11 37.6	. . .	9.999 331	+ 0 47 51.5
18	Bergen, Norway . .	+60 23 54	-10 2.7	. . .	9.998 888	- 5 29 28.53
19	Berkeley, Cal. . .	+37 52 23.6	-11 18.3	97	9.999 455	+ 3 0 46.94
20	Berlin, Prussia . .	+52 30 16.7	-11 17.1	47	9.999 078	- 6 1 50.63
21	Berlin, Prussia . .	+52 31 30.7	-11 17.0	. . .	9.999 075	- 6 1 43.23
22	Berlin, Prussia . .	+52 29 7	-11 17.3	38	9.999 078	- 6 2 10.0
23	Berne, Switzerland	+46 57 8.7	-11 39.0	573	9.999 255	- 5 38 1.51
24	Besançon, France .	+47 14 59.0	-11 38.5	310	9.999 229	- 5 32 12.95
25	Bethlehem, Pa. . .	+40 36 23.1	-11 31.9	. . .	9.999 379	- 0 6 43.93
26	Birr Castle, Ireland	+53 5 47.0	-11 13.3	56	9.999 064	- 4 36 34.9
27	Bloomington, Ind.	+39 9 54	-11 25.5	266	9.999 433	+ 0 38 38
28	Bogota.	+ 4 36 15.4	-11 51.5	2634	0.000 170	- 0 11 21.58
29	Bombay, India . .	+18 53 45	- 7 8.1	19	9.999 848	- 9 59 31.52
30	Bonn, Prussia . . .	+50 43 45.0	-11 26.9	62	9.999 124	- 5 36 39.00
31	Bordeaux, France	+44 50 7.2	-11 40.4	73	9.999 276	- 5 6 10.24
32	Boston, Mass. . . .	+42 20 58	-11 37.2	. . .	9.999 334	- 0 23 56.7
33	Bothkamp, Prussia	+54 12 9.6	-11 5.3	32	9.999 035	- 5 48 47.0
34	Bremen, Germany	+53 4 36	-11 13.4	. . .	9.999 061	- 5 43 31.7
35	Breslau, Prussia . .	+51 6 55.8	-11 25.0	147	9.999 120	- 6 16 24.57
36	Brisbane	-27 28 0	+ 9 32.2	. . .	9.999 689	+ 8 39 37.8
37	Brussels, Belgium.	+50 47 55.5	-11 26.6	100	9.999 125	- 5 25 42.7
38	Budapest, Hungary	+47 29 34.7	-11 38.0	. . .	9.999 202	- 6 24 31.1
39	Cambridge, Eng. . .	+52 12 51.6	-11 18.9	26	9.999 084	- 5 8 38.53
40	Cambridge, Mass. .	+42 22 47.6	-11 37.3	24	9.999 336	- 0 23 44.73
41	Cape of Good Hope	-33 56 3.6	+10 48.0	16	9.999 544	- 6 22 10.54
42	Carloforte	+39 8 9	-11 25.3	18	9.999 417	- 5 41 30.7
43	Catania, Sicily . .	+37 30 13.3	-11 16.0	47	9.999 460	- 6 8 36
44	Charkow, Russia . .	+50 0 9.6	-11 30.2	138	9.999 147	- 7 33 11.55
45	Charlottesville, Va.	+38 2 1.2	-11 19.3	250	9.999 461	+ 0 5 49.44

No.	LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
	In Time.	In Arc.		
	^h ^m ^s	[°] ['] ^{''}	^s	
1	+ 0 7 0.1	+ 1 45 1.5	+ 1.15	Obs. Paris Academy of Science, Hendaye.
2	- 9 14 20.30	- 138 35 4.5	- 91.06	 
3	+ 4 55 6.8	+ 73 46 42.0	+ 48.48	Dudley Obs. Old Obs. 36'' .8 N., 6°.79 E.
4	- 0 12 8.55	- 3 2 8.2	- 2.00	At Bouzaréah, near
5	+ 5 20 5.39	+ 80 1 20.8	+ 52.58	Univ. Old Obs., 76'' .4 S., 2°.46 E.
6	+ 4 50 5.93	+ 72 31 29.0	+ 47.66	Old Obs. 20'' .6 N., 1°.26 E.
7	+ 5 34 55.19	+ 83 43 47.8	+ 55.02	University of Michigan.
8	+ 5 53 35.89	+ 88 23 58.4	+ 58.09	the Lawrence University.
9	- 0 45 1.34	- 11 15 20.1	- 7.40	Italy.
10	+ 4 46 11.73	+ 71 32 56.0	+ 47.02	Harvard College Observatory
11	+ 0 26 35.4	+ 6 38 51.0	+ 4.37	University Observatory.
12	- 1 34 52.92	- 23 43 13.8	- 15.59	Greece.
13	+ 5 6 26.0	+ 76 36 30	+ 50.34	 Observatory.
14	- 0 43 33.65	- 10 53 24.8	- 7.16	
15	- 0 8 28.0	- 2 7 0	- 1.39	Fabra Acad. of Sci. and Arts.
16	- 7 43 38	- 115 54 30	- 76.16	West Australia.
17	+ 5 56 7.3	+ 89 1 49.5	+ 58.50	Beloit College.
18	- 0 21 12.75	- 5 18 11.2	- 3.48	Naval School.
19	+ 8 9 2.72	+ 122 15 40.8	+ 80.34	of the University of California.
20	- 0 53 34.85	- 13 23 42.8	- 8.80	Royal Obs. Old Obs. 56'' .4 N., 0°.39 W.
21	- 0 53 27.45	- 13 21 51.8	- 8.78	Urania
22	- 0 53 54.2	- 13 28 33	- 8.86	
23	- 0 29 45.73	- 7 26 26.0	- 4.89	University.
24	- 0 23 57.17	- 5 59 17.6	- 3.94	
25	+ 5 1 31.85	+ 75 22 57.8	+ 49.53	Sayre Obs. of Lehigh Univ. at South Bethlehem.
26	+ 0 31 40.9	+ 7 55 13.5	+ 5.20	Private  the Earl of Rosse.
27	+ 5 46 54	+ 86 43 30	+ 56.99	of Indiana
28	+ 4 56 54.20	+ 74 13 33.0	+ 48.77	of Colombia
29	- 4 51 15.74	- 72 48 56.1	- 47.85	Colaba
30	- 0 28 23.22	- 7 5 48.3	- 4.66	Observatory.
31	+ 0 2 5.54	+ 0 31 23.1	+ 0.34	Univ of Bordeaux at Floirac
32	+ 4 44 19.1	+ 71 4 46.5	+ 46.71	Univ Old Obs 34'' N., 4°.1 E.
33	- 0 40 31.2	- 10 7 48.0	- 6.66	Herr. von Bülow.
34	- 0 35 15.9	- 8 48 58.5	- 5.79	Observatory.
35	- 1 8 8.79	- 17 2 11.8	- 11.20	Observatory.
36	- 10 12 6.4	- 153 1 36	- 100.55	Queensland, Australia.
37	- 0 17 26.9	- 4 21 43.5	- 2.87	Belgium. Old Obs. 3' 18'' N., 1° 8 E.
38	- 1 16 15.3	- 19 3 49.5	- 12.53	 of Royal Polytechnic School.
39	- 0 0 22.75	- 0 5 41.2	- 0.06	 Observatory.
40	+ 4 44 31.05	+ 71 7 45.8	+ 46.74	Observatory.
41	- 1 13 54.76	- 18 28 41.4	- 12.14	Royal
42	- 0 33 14.9	- 8 18 43.5	- 5.46	 Sardinia.
43	- 1 0 20	- 15 5 0	- 9.91	Obs of the University.
44	- 2 24 55.77	- 36 13 56.6	- 23.81	
45	+ 5 14 5.22	+ 78 31 18.3	+ 51.60	Leander McCormick Obs. of Univ. of Virginia.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longit from Washin
		° ' "	' "			h m
46	Chicago, Ill. . . .	+41 50 1.0	-11 35.9	. . .	9.999 348	+ 0 42
47	Christiania, Norway	+59 54 44.0	-10 8.7	25	9.998 901	- 5 51
48	Cincinnati, Ohio .	+39 8 19.5	-11 25.4	249	9.999 433	+ 0 29
49	Cleveland, Ohio .	+41 30 14.5	-11 34.9	212	9.999 370	+ 0 18
50	Clinton, N. Y. . .	+43 3 17.0	-11 38.7	276	9.999 335	- 0 6
51	Coimbra, Portugal	+40 12 24.5	-11 30.3	99	9.999 396	- 4 34
52	Columbia, Mo. . .	+38 56 51.7	-11 24.4	225	9.999 436	+ 1 1
53	Columbus, Ohio .	+39 59 50.4	-11 29.4	. . .	9.999 394	+ 0 23
54	Copenhagen . . .	+55 41 12.6	-10 53.1	14	9.998 998	- 5 58
55	Cordoba	-31 25 15.2	+10 22.2	434	9.999 632	- 0 51
56	Cracow, Austria .	+50 3 52.0	-11 29.9	220	9.999 152	- 6 28
57	Dantzic	+54 21 18.0	-11 4.1	3	9.999 029	- 6 22
58	Dehra Dun, India.	+30 18 51.8	-10 9.4	687	9.999 674	-10 20
59	Denver, Colo. . .	+39 40 36.4	-11 27.9	1650	9.999 514	+ 1 51
60	Des Moines, Iowa .	+41 36 0	-11 35.2	296	9.999 374	+ 1 6
61	Dorpat, Russia .	+58 22 47.1	-10 26.4	65	9.998 938	- 6 55
62	Dresden, Saxony .	+51 2 16.8	-11 25.4	. . .	9.999 112	- 6 3
63	Dublin, Ireland .	+53 23 13.1	-11 11.3	86	9.999 059	- 4 42
64	Dun Echt., Scotland	+57 9 36	-10 39.2	141	9.998 972	- 4 58
65	Durham, England	+54 46 6.2	-11 0.9	107	9.999 026	- 5 1
66	Düsseldorf, Prussia	+51 12 25.0	-11 24.6	26	9.999 110	- 5 35
67	Edinburgh, Scotland	+55 55 28.0	-10 50.9	134	9.999 000	- 4 55
68	Edinburgh, Scotland	+55 57 23.2	-10 50.7	106	9.998 998	- 4 55
69	Evanston, Ill. . .	+42 3 33.4	-11 36.5	175	9.999 354	+ 0 42
70	Flagstaff, Ariz. .	+35 12 30.4	-10 59.2	2210	9.999 664	+ 2 18
71	Gaithersburg, Md.	+39 8 13.2	-11 25.4	165	9.999 427	+ 0 0
72	Geneva, N. Y. . .	+42 52 46.2	-11 38.3	152	9.999 331	- 0 0
73	Geneva, Switzerland	+46 11 58.8	-11 39.9	406	9.999 264	- 5 32
74	Genoa, Italy . . .	+44 25 9.3	-11 40.2	105	9.999 288	- 5 43
75	Georgetown, D. C.	+38 54 26.7	-11 24.2	46	9.999 425	+ 0 0
76	Glasgow, Mo. . . .	+39 13 45.6	-11 25.8	227	9.999 430	+ 1 3
77	Glasgow, Scotland.	+55 52 42.8	-10 51.5	55	9.998 997	- 4 51
78	Gotha, Germany .	+50 56 37.9	-11 25.9	320	9.999 136	- 5 51
79	Göttingen, Prussia	+51 31 47.9	-11 22.8	160	9.999 111	- 5 48
80	Greencastle, Ind. .	+39 38 46.6	-11 27.8	262	9.999 421	+ 0 39
81	Greenwich, England	+51 28 38.1	-11 23.1	47	9.999 104	- 5 8
82	Hamburg, Germany	+53 28 46.0	-11 10.6	40	9.999 054	- 5 49
83	Hamburg, Germany	+53 33 7.0	-11 10.1	25	9.999 051	- 5 48
84	Hamburg, Germany	+53 32 51.8	-11 10.2	30	9.999 051	- 5 48
85	Hanover, N. H. . .	+43 42 15.3	-11 39.6	183	9.999 312	- 0 19
86	Haverford, Pa. . .	+40 0 40.1	-11 29.4	. . .	9.999 394	- 0 7
87	Heidelberg, Baden	+49 23 55.2	-11 32.6	570	9.999 192	- 5 43
88	Heidelberg, Baden	+49 23 54.9	-11 32.6	562	9.999 191	- 5 43
89	Helsingfors, Finland	+60 9 42.6	-10 5.6	38	9.998 896	- 6 48
90	Herény, Hungary .	+47 15 47.4	-11 38.4	229	9.999 224	- 6 14

No.	LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
	In Time.	In Arc.		
	<div>h m s</div>	<div>° ' "</div>	<div>°</div>	
46	+5 50 26.84	+ 87 36 42.6	+57.57	Old Obs.; transferred to Evanston, Ill., in 1887.
47	−0 42 53.52	− 10 43 22.8	− 7.05	Observatory of the University.
48	+5 37 41.40	+ 84 25 21.0	+55.48	Univ.Obs.on Mt.Lookout.Old Obs.1'53''S.17°.6W.
49	+5 26 25.82	+ 81 36 27.3	+53.62	Obs. of Case School of Applied Science.
50	+5 1 37.45	+ 75 24 21.7	+49.55	Litchfield Obs. of Hamilton College.
51	+0 33 43.1	+ 8 25 46.5	+ 5.54	Royal Astronomical Observatory of Portugal.
52	+6 9 18.33	+ 92 19 35.0	+60.67	Laws Observatory of the University of Missouri.
53	+5 32 2.6	+ 83 0 39.0	+54.55	Emerson McMillan Obs. of Ohio State Univ.
54	−0 50 18.70	− 12 34 40.5	− 8.26	University Observatory, Denmark.
55	+4 16 48.22	+ 64 12 3.3	+42.19	National Observatory of Argentine Republic.
56	−1 19 50.28	− 19 57 34.2	−13.12	Royal University Observatory.
57	−1 14 39.6	− 18 39 54.0	−12.26	Western Prussia.
58	−5 12 13.47	− 78 3 22.0	−51.29	Obs. Great Trigonometric Survey of India.
59	+6 59 47.63	+104 56 54.4	+68.96	Chamberlin Observatory of the Univ. of Denver.
60	+6 14 30.56	+ 93 37 38.4	+61.52	Drake University Observatory.
61	−1 46 53.29	− 26 43 19.3	−17.56	Observatory Imperial University (Jurjew).
62	−0 54 54.85	− 13 43 42.7	− 9.02	Baron Engelhardt's Observatory.
63	+0 25 21.1	+ 6 20 16.5	+ 4.16	Observatory of Trinity College at Dunsink.
64	+0 9 40.0	+ 2 25 0.0	+ 1.59	Formerly Lord Crawford's Observatory.
65	+0 6 19.75	+ 1 34 56.3	+ 1.04	Observatory of the University.
66	−0 27 5.0	− 6 46 15.0	− 4.45	Municipal Observatory, Bilk.
67	+0 12 44.2	+ 3 11 3.0	+ 2.09	Royal Obs. of Scotland, Blackford Hill.
68	+0 12 43.1	+ 3 10 46.5	+ 2.09	City Observatory, Calton Hill.
69	+5 50 42.3	+ 87 40 34.5	+57.61	Dearborn Observatory of North Western Univ.
70	+7 26 44.57	+111 41 8.6	+73.39	Lowell Observatory.
71	+5 8 47.73	+ 77 11 56.0	+50.73	International Latitude Observatory.
72	+5 8 1.00	+ 77 0 15.0	+50.60	Smith Observatory.
73	−0 24 36.71	− 6 9 10.7	− 4.04	Municipal Observatory.
74	−0 35 41.33	− 8 55 20.0	− 5.86	Hydrographic Institute.
75	+5 8 18.26	+ 77 4 33.9	+50.65	Georgetown College Observatory, Washington.
76	+6 11 18.08	+ 92 49 31.2	+61.00	Morrison Observatory.
77	+0 17 10.55	+ 4 17 38.3	+ 2.82	University Observatory.
78	−0 42 50.49	− 10 42 37.3	− 7.04	Ducal Observatory, Saxe-Coburg-Gotha.
79	−0 39 46.29	− 9 56 34.3	− 6.53	Royal University Observatory.
80	+5 47 24.34	+ 86 51 5.1	+57.07	McKim Observatory of De Pauw University.
81	0 0 0.00	0 0 0.0	0.00	Royal Observatory.
82	−0 40 58.5	− 10 14 37.5	− 6.73	New Observatory, Bergedorf.
83	−0 39 53.8	− 9 58 27.0	− 6.55	Old Observatory.
84	−0 39 53.42	− 9 58 21.3	− 6.55	Imperial Marine Observatory.
85	+4 49 7.91	+ 72 16 58.7	+47.50	Shattuck Observatory of Dartmouth College.
86	+5 1 12.70	+ 75 18 10.5	+49.48	Haverford College Observatory.
87	−0 34 53.13	− 8 43 17.0	− 5.73	Astronomical Institute, Königstuhl.
88	−0 34 54.25	− 8 43 33.7	− 5.73	Astrophysical Institute, Königstuhl.
89	−1 39 49.15	− 24 57 17.3	−16.40	University Observatory.
90	−1 6 24.7	− 16 36 10.5	−10.91	Astrophysical Obs., near Steinamanger.

No.	PLACE.	Geographic Latitude	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington
		° ' "	' "			h m s
91	Hong Kong, China	+22 18 13.4	- 8 10.7	34	9.999 791	+11 15 2.36
92	Iowa City, Iowa	+41 40 0	-11 35.4	183	9.999 364	+ 0 57 50
93	Ithaca, N. Y.	+42 26 47.3	-11 37.4	256	9.999 349	- 0 2 19.79
94	Jamaica, West Indies	+18 24 51	- 6 58.7	. . .	9.999 854	+ 0 3 13.70
95	Jena, Saxe-Weimar	+50 55 34.9	-11 26.0	156	9.999 126	- 5 54 36.05
96	eimer	+50 56 11.0	-11 25.9	174	9.999 126	- 5 54 36.56
97	. . .	-26 10 54.5	+ 9 13.5	1806	9.999 838	- 7 0 33.8
98	Kalocsa	+46 31 41.7	-11 39.6	117	9.999 235	- 6 24 10.12
99	Kasan, Russia . . .	+55 50 20.0	-10 51.7	98	9.999 000	- 8 23 32.3
100	Kasan, Russia . . .	+55 47 24.3	-10 52.2	79	9.999 000	- 8 24 44.82
101	Kew, Eng.	+51 28 6	-11 23.2	11	9.999 102	- 5 7 0.7
102	Kief, Russia . . .	+50 27 10.5	-11 28.2	182	9.999 139	- 7 10 16.42
103	Kiel, Prussia . . .	+54 20 27.6	-11 4.3	48	9.999 033	- 5 48 51.33
104	. . .	+47 41 54.8	-11 37.5	. . .	9.999 197	- 6 26 27.5
105	, Prussia	+54 42 50.4	-11 1.3	22	9.999 022	- 6 30 14.82
106	. . .	+48 3 23.1	-11 36.7	384	9.999 214	- 6 4 47.37
107	La Plata	-34 54 30.3	+10 56.7	12	9.999 521	- 1 16 38.8
108	Lawrence, Kansas .	+36 57 30	-11 12.4	311	9.999 491	+ 1 12 42
109	Leiden, Netherlands	+52 9 20.0	-11 19.3	4	9.999 084	- 5 26 11.95
110	Leipzig, Saxony . .	+51 20 5.9	-11 23.9	119	9.999 112	- 5 57 49.76
111	. . .	+50 37 7	-11 27.5	127	9.999 132	- 5 30 31.0
112	. . .	+38 42 31.3	-11 23.1	94	9.999 433	- 4 31 31.10
113	. . .	+53 24 4.8	-11 11.2	62	9.999 057	- 4 55 58.45
114	. . .	+55 41 51.6	-10 53.0	38	9.999 000	- 6 1 0.79
115	. . .	+44 32 11.0	-11 40.3	42	9.999 281	- 6 6 8.19
116	. . .	+45 41 41.0	-11 40.3	300	9.999 268	- 5 27 24.33
117	. . .	+43 4 36.8	-11 38.7	292	9.999 336	+ 0 49 22.15
118	Madras, India . . .	+13 4 8.0	- 5 7.6	7	9.999 925	-10 29 14.90
119	Madrid, Spain . . .	+40 24 29.7	-11 31.1	655	9.999 428	- 4 53 30.66
120	Manila, P. I. . . .	+14 35 25	- 5 40.5	3	9.999 907	+10 47 54
121	Mare Island, Cal. .	+38 5 55.8	-11 19.7	111	9.999 444	+ 3 0 49.8
122	Mark	+54 10 31.8	-11 5.5	45	9.999 037	- 4 34 27.4
123	Marseilles, France .	+43 18 17.5	-11 39.1	75	9.999 315	- 5 29 50.37
124	Mauritius	-20 5 39	+ 7 30.8	55	9.999 832	- 8 58 28.4
125	Melbourne, Victoria	-37 49 53.4	+11 18.1	28	9.999 451	+ 9 11 50.2
126	Meudon, France . .	+48 48 18	-11 34.6	162	9.999 180	- 5 17 11.4
127	Middletown, Conn.	+41 33 16.0	-11 35.1	. . .	9.999 355	- 0 17 38.60
128	Milan, Italy	+45 27 59.3	-11 40.4	120	9.999 262	- 5 45 1.70
129	. . .	+44 58 40.0	-11 40.4	260	9.999 285	+ 1 4 41.06
130	. . .	+39 8 3.6	-11 25.4	62	9.999 420	+ 9 27 13.47
131	Modena, Italy . . .	+44 38 52.8	-11 40.4	. . .	9.999 275	- 5 51 58.7
132	Montreal, Canada .	+45 30 17.0	-11 40.4	67	9.999 258	- 0 13 57.15
133	Moscow, Russia . .	+55 45 19.8	-10 52.5	150	9.999 005	- 7 38 32.87
134	Mount Hamilton . .	+37 20 25.6	-11 14.9	1283	9.999 548	+ 2 58 19.11
135	Mount Wilson . . .	+34 12 59.5	-10 50.6	1800	9.999 660	+ 2 43 58.55

No.	LONGITUDE FROM GREENWICH.			Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.			
	In Time.		In Arc.					
	h	m	s	°	'	"	s	
91	-7	36	41.86	-114	10	27.9	-75.01	British Colonial Observatory.
92	+6	6	6	+ 91	31	30	+60.14	Obs. of the State Univ. of Iowa.
93	+5	5	55.99	+ 76	28	59.9	+50.26	Observatory of Cornell University.
94	+5	11	29.48	+ 77	52	22.2	+51.17	Mr. Hall's Observatory, Montego Bay.
95	-0	46	20.27	- 11	35	4.0	- 7.61	University Observatory.
96	-0	46	20.78	- 11	35	11.7	- 7.61	The late Dr. Winkler's Observatory.
97	-1	52	18.0	- 28	4	30.0	-18.45	Government Observatory, Transvaal.
98	-1	15	54.34	- 18	58	35.1	-12.47	Haynald Obs., Hungary.
99	-3	15	16.5	- 48	49	7.5	-32.08	Englehardt Observatory.
100	-3	16	29.04	- 49	7	15.6	-32.28	Imperial Univ. Observatory.
101	+0	1	15.1	+ 0	18	46.5	+ 0.21	Meteorological Obs., Kew Gardens, London.
102	-2	2	0.64	- 30	30	9.6	-20.04	Imperial University Observatory.
103	-0	40	35.55	- 10	8	53.3	- 6.67	Old position of Transit Circle, 0''.9 N., 0°.12 E.
104	-1	18	11.7	- 19	32	55.5	-12.85	Near Aszód, Hungary.
105	-1	21	59.04	- 20	29	45.6	-13.47	Royal University Observatory.
106	-0	56	31.59	- 14	7	53.9	- 9.29	Obs. of the Benedictines, Austria.
107	+3	51	37.0	+ 57	54	15.0	+38.05	Obs. National Univ., Argentine Republic.
108	+6	20	58	+ 95	14	30	+62.58	Obs. of the State Univ. of Kansas.
109	-0	17	56.17	- 4	29	2.6	- 2.95	University Observatory.
110	-0	49	33.98	- 12	23	29.7	- 8.14	University Observatory.
111	-0	22	15.2	- 5	33	48.0	- 3.66	University Observatory, Cointe.
112	+0	36	44.68	+ 9	11	10.2	+ 6.04	Royal Astronomical Obs., Tapada.
113	+0	12	17.33	+ 3	4	20.0	+ 2.02	Bidston, Birkenhead.
114	-0	52	45.01	- 13	11	15.1	- 8.67	Royal Observatory of the University.
115	-0	57	52.41	- 14	28	6.1	- 9.51	Manora Observatory, Austria.
116	-0	19	8.55	- 4	47	8.3	- 3.14	Obs. of the Univ., St. Genis, Laval.
117	+5	57	37.93	+ 89	24	29.0	+58.75	Washburn Obs. of Univ. of Wisconsin.
118	-5	20	59.12	- 80	14	46.8	-52.73	Founded by East India Company.
119	+0	14	45.12	+ 3	41	16.8	+ 2.42	Ast. and Meteorological Observatory.
120	-8	3	50	-120	57	30	-79.48	Meteorological Observatory.
121	+8	9	5.6	+122	16	24.0	+80.35	U. S. Naval Observatory.
122	+0	33	48.4	+ 8	27	6.0	+ 5.55	Obs. of Col. Cooper, near Collooney.
123	-0	21	34.59	- 5	23	38.9	- 3.54	National Obs., Univ. of Aix-Marseilles.
124	-3	50	12.6	- 57	33	9.0	-37.82	Royal Alfred Observatory, Port-Louis.
125	-9	39	54.0	-144	58	30.0	-95.26	State Obs.; transf. from Williamstown in 1861.
126	-0	8	55.6	- 2	13	54.0	- 1.47	Seine-et-Oise, near Paris.
127	+4	50	37.18	+ 72	39	17.7	+47.74	Wesleyan University Observatory.
128	-0	36	45.92	- 9	11	28.8	- 6.04	Royal Observatory, Brera.
129	+6	12	56.84	+ 93	14	12.6	+61.27	Obs. of the State University of Minnesota.
130	-9	24	30.75	-141	7	41.3	-92.74	International Latitude Observatory.
131	-0	43	42.9	- 10	55	43.5	- 7.18	Ducal Observatory.
132	+4	54	18.63	+ 73	34	39.4	+48.35	McGill University Observatory.
133	-2	30	17.09	- 37	34	16.3	-24.69	Obs. of the Imperial University, Presnia.
134	+8	6	34.89	+121	38	43.3	+79.93	Lick Obs. of the University of California.
135	+7	52	14.33	+118	3	34.9	+77.58	Solar Observatory, near Pasadena, Cal.

No.	PLACE.	Geographic Latitude.	Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.
		° ' "	' "			h m s
136	Munich, Bavaria . . .	+48 8 45.5	-11 36.5	528	9.999 222	- 5 54 41.85
137		+40 51 46.3	-11 32.8	154	9.999 382	- 6 5 17.51
138		+36 8 54.4	-11 6.6	. . .	9.999 490	+ 0 38 56.4
139	Natal, S. Africa . . .	-29 50 46.6	+10 3.7	79	9.999 642	- 7 12 16.96
140	Neuchâtel . . .	+47 0 1.2	-11 38.9	488	9.999 248	- 5 36 5.71
141	New J. . .	+40 30 0.6	-11 31.5	21	9.999 384	- 0 10 29.4
142	New . . .	+41 19 22.3	-11 34.4	40	9.999 364	- 0 16 35.20
143	New York, N. Y. . .	+40 48 34.6	-11 32.6	. . .	9.999 374	- 0 12 26
144	Nice, France . . .	+43 43 16.9	-11 39.6	376	9.999 325	- 5 37 27.96
145		+46 58 21.8	-11 38.9	55	9.999 220	- 7 16 9.58
146		+42 19 2	-11 37.2	81	9.999 340	- 0 17 42.7
147		+44 27 41.6	-11 40.3	320	9.999 302	+ 1 4 20.03
148		+37 48 5	-11 17.9	11	9.999 450	+ 3 0 50.77
149	Odessa, Russia . . .	+46 28 37.9	-11 39.6	. . .	9.999 228	- 7 11 18.0
150	Odessa, Russia . . .	+46 28 36.7	-11 39.6	55	9.999 232	- 7 11 17.88
151		+47 52 27.3	-11 37.1	113	9.999 200	- 6 21 1.32
152		+41 16 5.6	-11 34.3	344	9.999 384	+ 1 15 31.18
153	Oncativo, Arg. Rep. . .	-31 55 10	+10 27.8	280	9.999 610	- 0 53 31.0
154		+44 53 58	-11 40.4	41	9.999 272	- 0 33 35.5
155	Ottawa, Canada . . .	+45 23 30	-11 40.4	85	9.999 262	- 0 5 22
156	Oxford, Miss. . .	+34 22 12.6	-10 52.0	. . .	9.999 533	+ 0 49 51.3
157	Oxford, Eng. . .	+51 45 35.4	-11 21.6	65	9.999 098	- 5 3 13.2
158		+51 45 34.2	-11 21.6	64	9.999 098	- 5 3 15.4
159		+45 24 5	-11 40.4	30	9.999 258	- 5 55 44.97
160		+38 6 44.0	-11 19.7	72	9.999 447	- 6 1 41.68
161	Paris, France . . .	+48 50 11.2	-11 34.5	61	9.999 172	- 5 17 36.75
162	Perth . . .	-31 57 8.9	+10 28.1	61	9.999 594	+11 8 22.48
163	Pa. . .	+39 58 2.1	-11 29.2	74	9.999 400	- 0 7 9.2
164		+44 51 48.7	-11 40.4	30	9.999 272	- 6 3 38.67
165	Potsdam, Prussia . . .	+52 22 56.0	-11 17.9	97	9.999 085	- 6 0 31.7
166	Y. . .	+41 41 18	-11 35.5	46	9.999 354	- 0 12 42.13
167		+50 5 15.8	-11 29.8	197	9.999 149	- 6 5 56.1
168		+40 20 55.8	-11 30.9	50	9.999 389	- 0 9 36.34
169		+41 50 21	-11 35.9	64	9.999 352	- 0 22 39.83
170	, R. I. . .	+41 49 46.4	-11 35.9	. . .	9.999 348	- 0 22 38.14
171		+59 46 18.7	-10 10.4	74	9.998 907	- 7 9 34.42
172	Quebec, Canada . . .	+46 47 59.2	-11 39.2	90	9.999 226	- 0 23 23.14
173	Quito . . .	- 0 14 0	+ 0 5.7	2908	0.000 198	+ 0 5 50.88
174	Riga, Russia . . .	+56 57 9.3	-10 41.3	. . .	9.998 967	- 6 44 43.95
175	Rio de Janeiro . . .	-22 54 23.6	+ 8 21.1	61	9.999 783	- 2 15 34.4
176	Rome, Italy . . .	+41 53 53.6	-11 36.1	51	9.999 350	- 5 58 11.33
177	Rome, Italy. . .	+41 53 33.5	-11 36.0	65	9.999 350	- 5 58 12.15
178	Rome, Italy. . .	+41 54 4.8	-11 36.1	100	9.999 353	- 5 58 5.25
179	San Fernando . . .	+36 27 42.0	-11 8.9	30	9.999 485	- 4 43 26.6
180	San Francisco, Cal. . .	+37 47 27.9	-11 17.8	. . .	9.999 450	+ 3 1 27.08

No.	LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
	In Time.	In Arc.		
	h m s	° ' "	s	
36	−0 46 26.07	− 11 36 31.0	− 7.63	Royal Observatory.
37	−0 57 1.73	− 14 15 26.0	− 9.37	Royal Obs., Capo di Monte.
38	+5 47 12.2	+ 86 48 3.0	+57.04	Observatory of Vanderbilt University.
39	−2 4 1.18	− 31 0 17.7	−20.37	Government Observatory, Durban.
40	−0 27 49.93	− 6 57 29.0	− 4.57	Cantonal Observatory, Switzerland.
41	+4 57 46.4	+ 74 26 36	+48.92	Schank Obs., Rutgers College.
42	+4 51 40.58	+ 72 55 8.7	+47.92	Yale University Obs. Old Obs. 45'' .8 S., 1° .58 W.
43	+4 55 50	+ 73 57 30	+48.60	Columbia Univ. Obs. Old Obs. 3' 11'' .5 S., 3° .6 E.
44	−0 29 12.18	− 7 18 2.7	− 4.80	Mt. Gros, near Nice.
45	−2 7 53.80	− 31 58 27.0	−21.01	Naval Observatory.
46	+4 50 33.1	+ 72 38 16.5	+47.73	Smith College Observatory.
47	+6 12 35.81	+ 93 8 57.1	+61.21	Goodsell Observatory of Carleton College.
48	+8 9 6.55	+122 16 38.3	+80.35	Chabot University.
49	−2 3 2.18	− 30 45 32.7	−20.21	Branch of Pulkowa Observatory.
50	−2 3 2.10	− 30 45 31.5	−20.21	University Observatory.
51	−1 12 45.54	− 18 11 23.1	−11.95	Royal Astrophysical Observatory.
52	+6 23 46.96	+ 95 56 44.4	+63.05	Creighton University Observatory.
53	+4 14 44.8	+ 63 41 12.0	+41.85	International Latitude Observatory.
54	+4 34 40.3	+ 68 40 4.5	+45.12	Observatory of the University of Maine.
55	+5 2 54	+ 75 43 30	+49.76	Dominion Observatory.
56	+5 58 7.1	+ 89 31 46.5	+58.83	Observatory of the University of Mississippi.
57	+0 5 2.6	+ 1 15 39.0	+ 0.83	Radcliffe Observatory.
58	+0 5 0.4	+ 1 15 6.0	+ 0.82	University Observatory.
59	−0 47 29.19	− 11 52 17.9	− 7.80	Royal University Observatory.
60	−0 53 25.90	− 13 21 28.5	− 8.78	Royal Observatory.
61	−0 9 20.97	− 2 20 14.6	− 1.53	National Observatory of Paris.
62	−7 43 21.74	−115 50 26.1	−76.12	State Observatory, West Australia.
63	+5 1 6.6	+ 75 16 39.0	+49.46	Flower Observatory, University of Pennsylvania.
64	−0 55 22.89	− 13 50 43.3	− 9.10	Obs. of the Imperial Hydrographic Office.
65	−0 52 15.9	− 13 3 58.5	− 8.59	Royal Astrophysical Observatory.
66	+4 55 33.65	+ 73 53 24.7	+48.55	Vassar College Observatory.
67	−0 57 40.3	− 14 25 4.5	− 9.47	Royal Observatory of the University.
68	+4 58 39.44	+ 74 39 51.6	+49.06	Halsted Observatory of Princeton University.
69	+4 45 35.95	+ 71 23 59.3	+46.92	Ladd Observatory of Brown University.
70	+4 45 37.64	+ 71 24 24.6	+46.92	Mr. Seagrave's Observatory.
71	−2 1 18.64	− 30 19 39.6	−19.93	Obs. Central Nicolas, near St. Petersburg.
72	+4 44 52.64	+ 71 13 9.6	+46.80	Bonner's Hill.
73	+5 14 6.66	+ 78 31 39.9	+51.60	National Observatory of Ecuador.
74	−1 36 28.17	− 24 7 2.6	−15.85	Polytechnic School Observatory.
75	+2 52 41.4	+ 43 10 21.0	+28.37	National Observatory of Brazil.
76	−0 49 55.55	− 12 28 53.3	− 8.20	Royal Observatory at Roman College.
77	−0 49 56.37	− 12 29 5.6	− 8.20	Royal University Observatory at Capitol.
78	−0 49 49.47	− 12 27 22.0	− 8.18	Vatican Observatory.
79	+0 24 49.2	+ 6 27 18.0	+ 4.08	Naval Observatory, near Cadiz, Spain.
80	+8 9 42.86	+122 25 42.9	+80.45	Davidson Observatory.

No.	PLACE.	Geographic Latitude.			Reduction to Geocentric Latitude.	Altitude (Meters).	Log ρ (Including altitude).	Longitude from Washington.		
		°	'	"	'	"		h	m	s
181	San Luis, Arg. Rep.	-33	18	0	+10	42.0	800	9.999 614	- 0	42 52
182	Santiago, Chile .	-33	26	42.0	+10	43.4	519	9.999 590	- 0	25 29.56
183	South Hadley, Mass.	+42	15	18.2	-11	37.0	76	9.999 342	- 0	17 55.49
184	St. Louis, Mo. . .	+38	38	3.0	-11	22.7	. . .	9.999 429	+ 0	52 33.48
185	St. Petersburg . .	+59	56	32.0	-10	8.4	4	9.998 898	- 7	9 27.2
186	Stockholm, Sweden	+59	20	33.0	-10	15.5	44	9.998 915	- 6	20 29.77
187	Stonyhurst, Eng. .	+53	50	40	-11	8.0	116	9.999 050	- 4	58 23.10
188	Strassburg, Alsace	+48	35	0.3	-11	35.3	144	9.999 184	- 5	39 20.47
189	Sydney, N. S. W. .	-33	51	41.1	+10	47.3	44	9.999 548	+ 8	46 54.68
190	Syracuse, N. Y. .	+43	2	13.1	-11	38.6	160	9.999 328	- 0	3 42.42
191	Tacubaya . . .	+19	24	17.5	- 7	17.8	2280	9.999 994	+ 1	28 30.75
192	Tashkent . . .	+41	19	31.3	-11	34.4	457	9.999 392	- 9	45 26.58
193	Taunton, Mass. . .	+41	54	0	-11	36.1	8	9.999 347	- 0	23 56
194	Teramo, Italy . .	+42	39	27	-11	37.9	398	9.999 354	- 6	3 12
195	Tokio, Japan . .	+35	39	17.5	-11	2.8	. . .	9.999 502	+ 9	32 46.20
196	Toronto, Canada .	+43	39	35.9	-11	39.6	108	9.999 308	+ 0	9 18.87
197	Toulouse, France .	+43	36	45	-11	39.5	194	9.999 315	- 5	14 5.66
198	Triest, Austria . .	+45	38	45.4	-11	40.3	67	9.999 255	- 6	3 18.73
199	Troy, N. Y. . . .	+42	43	52.9	-11	38.1	. . .	9.999 325	- 0	13 33.49
200	Tschardjui . . .	+39	8	10.7	-11	25.4	167	9.999 427	- 9	22 13.1
201	Tulse Hill . . .	+51	26	47.0	-11	23.3	48	9.999 105	- 5	7 48.1
202	Turin, Italy . . .	+45	4	8.0	-11	40.4	276	9.999 284	- 5	39 2.96
203	Tuscaloosa, Ala. .	+33	12	36.8	-10	41.1	. . .	9.999 561	+ 0	41 55.96
204	Ukiah, Cal. . . .	+39	8	12.1	-11	25.4	220	9.999 431	+ 3	3 53
205	Upsala, Sweden .	+59	51	29.4	-10	9.3	21	9.998 901	- 6	18 45.93
206	Urbana, Ill. . . .	+40	6	20.2	-11	29.8	236	9.999 408	+ 0	44 38.2
207	Utrecht, Netherlands	+52	5	9.6	-11	19.7	13	9.999 087	- 5	28 46.8
208	Venice, Italy . .	+45	26	10.5	-11	40.4	15	9.999 256	- 5	57 37.90
209	Vienna, Austria .	+48	13	55.4	-11	36.2	240	9.999 199	- 6	13 37.17
210	Vienna, Austria .	+48	12	53.8	-11	36.2	214	9.999 198	- 6	13 41.1
211	Vienna, Austria .	+48	12	46.7	-11	36.2	280	9.999 202	- 6	13 26.89
212	Warsaw, Russia .	+52	13	4.7	-11	18.9	110	9.999 090	- 6	32 23.06
213	Washington, D. C.	+38	55	14.0	-11	24.2	82	9.999 428	0	0 0.00
214	Washington, D. C.	+38	53	38.8	-11	24.1	31	9.999 424	- 0	0 3.63
215	Washington, D. C.	+38	53	17.3	-11	24.1	9	9.999 422	- 0	0 9.6
216	Washington, D. C.	+38	56	14.8	-11	24.2	. . .	9.999 422	- 0	0 15.78
217	Wellesley, Mass. .	+42	17	43	-11	37.1	61	9.999 340	- 0	23 3
218	Wellington . . .	-41	18	0.6	+11	34.3	47	9.999 364	+ 7	12 37.70
219	West Point, N. Y.	+41	23	22.1	-11	34.6	170	9.999 371	- 0	12 25.23
220	Wilhelmshaven .	+53	31	52.2	-11	10.3	8	9.999 051	- 5	40 50.89
221	Williams Bay, Wis.	+42	34	12.6	-11	37.7	335	9.999 352	+ 0	45 57.46
222	Williamstown, Mass.	+42	42	30	-11	38.0	213	9.999 340	- 0	15 26
223	Windsor, N. S. W.	-33	36	30.8	+10	44.9	16	9.999 552	+ 8	48 23.7
224	Zô-Sè, China . .	+31	5	47.7	-10	18.6	100	9.999 617	+10	46 59.5
225	Zürich	+47	22	40.0	-11	38.2	470	9.999 237	- 5	42 28.08

No.	LONGITUDE FROM GREENWICH.		Reduction from Gr. Sid. Time of Mean Noon to Local S. T. M. N.	DESCRIPTION.
	In Time.	In Arc.		
	h m s	° ' "	s	
181	+ 4 25 24	+ 66 21 0	+ 43.60	Southern Observatory of Carnegie Institution.
182	+ 4 42 46.22	+ 70 41 33.3	+ 46.45	National Obs. of Chile. Old Obs. 16'' .6 N., 9°.5 E.
183	+ 4 50 20.29	+ 72 35 4.3	+ 47.70	Observatory of Mt. Holyoke College.
184	+ 6 0 49.26	+ 90 12 18.9	+ 59.27	Washington University Observatory.
185	- 2 1 11.4	- 30 17 51.0	- 19.91	Imperial University Observatory, Russia.
186	- 1 12 13.99	- 18 3 29.9	- 11.87	Observatory of Academy of Science.
187	+ 0 9 52.68	+ 2 28 10.2	+ 1.62	Stonyhurst College Observatory, near Blackburn.
188	- 0 31 4.69	- 7 46 10.3	- 5.11	Imperial University Observatory.
189	- 10 4 49.54	- 151 12 23.1	- 99.36	Government Observatory.
190	+ 5 4 33.36	+ 76 8 20.4	+ 50.03	Observatory of Syracuse University.
191	+ 6 36 46.53	+ 99 11 38.0	+ 65.18	National Observatory of Mexico.
192	- 4 37 10.80	- 69 17 42.0	- 45.53	Turkestan, Russia.
193	+ 4 44 20	+ 71 5 0	+ 46.71	Mr. Metcalf's Observatory.
194	- 0 54 56	- 13 44 0	- 9.02	At Collurania, near Teramo.
195	- 9 18 58.02	- 139 44 30.3	- 91.82	University Observatory.
196	+ 5 17 34.65	+ 79 23 39.7	+ 52.17	University Observatory.
197	- 0 5 49.88	- 1 27 28.2	- 0.96	University Observatory.
198	- 0 55 2.95	- 13 45 44.3	- 9.04	Imperial Maritime Observatory.
199	+ 4 54 42.29	+ 73 40 34.3	+ 48.41	Observatory Rensselaer Polytechnic Institute.
200	- 4 13 57.3	- 63 29 19.5	- 41.72	International Latitude Obs., Turkestan.
201	+ 0 0 27.7	+ 0 6 55.5	+ 0.08	Observatory of Sir W. Huggins, London.
202	- 0 30 47.18	- 7 41 47.7	- 5.06	Royal Observatory, Palazzo Madama.
203	+ 5 50 11.74	+ 87 32 56.1	+ 57.53	Observatory of the University of Alabama.
204	+ 8 12 9	+ 123 2 15	+ 80.85	International Latitude Observatory.
205	- 1 10 30.15	- 17 37 32.3	- 11.58	University Observatory.
206	+ 5 52 54.0	+ 88 13 30	+ 57.97	Observatory of the University of Illinois.
207	- 0 20 31.0	- 5 7 45.0	- 3.37	University Observatory, Sonnenborgh.
208	- 0 49 22.12	- 12 20 31.8	- 8.11	Observatory of the Nautical Institute.
209	- 1 5 21.39	- 16 20 20.9	- 10.74	Imperial Univ. Obs. Old Obs. 1' 20'' S., 10°.25 E.
210	- 1 5 25.3	- 16 21 19.5	- 10.75	Oppolzer Observatory, Josephstadt.
211	- 1 5 11.11	- 16 17 46.7	- 10.71	Kuffner Observatory, Ottakring.
212	- 1 24 7.28	- 21 1 49.2	- 13.82	Imperial University Observatory.
213	+ 5 8 15.78	+ 77 3 56.7	+ 50.64	U. S. Naval Observatory, Georgetown Heights.
214	+ 5 8 12.15	+ 77 3 2.3	+ 50.63	Old U. S. Naval Observatory. 1842-1893.
215	+ 5 8 6.2	+ 77 1 33.0	+ 50.61	Smithsonian Astrophysical Observatory.
216	+ 5 8 0.0	+ 77 0 0.0	+ 50.60	Catholic University Obs., Brookland, D. C.
217	+ 4 45 13	+ 71 18 15	+ 46.85	Whitin Observatory of Wellesley College.
218	- 11 39 6.52	- 174 46 37.8	- 114.85	Colonial Time Service Obs. of New Zealand.
219	+ 4 55 50.55	+ 73 57 38.3	+ 48.60	U. S. Military Academy. Old Obs. 9'' N., 1°.2 E.
220	- 0 32 35.11	- 8 8 46.7	- 5.35	Imperial Naval Observatory of Germany.
221	+ 5 54 13.24	+ 88 33 18.6	+ 58.19	Yerkes Observatory of University of Chicago.
222	+ 4 52 50	+ 73 12 30	+ 48.10	Field Memorial Observatory, Williams College.
223	- 10 3 20.5	- 150 50 7.5	- 99.11	Mr. John Tebbutt's Observatory.
224	- 8 4 44.7	- 121 11 10.5	- 79.63	Obs. of the Jesuits near Shanghai.
225	- 0 34 12.30	- 8 33 4.5	- 5.62	Obs. of the Polytechnic School, Switzerland.

THE COMPUTATION OF LUNAR DISTANCES.

The tables of lunar distances formerly given on pages XIII to XVIII, inclusive, for each month of the Greenwich Ephemeris, are omitted, as it has been decided by the authorities of the Navy Department that they are now of little practical use to navigators. However, in case it is desired to use this method, the angular distance between the Moon and any heavenly body may be calculated by solving the spherical triangle of which the known parts are the polar distances of the Moon and the other body and the difference of their right ascensions, or, in other words, the angle at the pole between their hour-circles. Then, the Greenwich mean time of the observation being approximately known, and the lunar distances for the star or other body calculated for the even hour before and after, the required lunar distance may be interpolated and the longitude derived by the methods given in Bowditch and other books on navigation.

EXAMPLE 1.

Find the lunar distance of Aldebaran, May 11, 1913, at 8 P. M. Greenwich Mean Time.

Let α and δ = Right Ascension and Declination of the star

" α' and δ' = " " " " " Moon

" D = Lunar Distance

Also let $\tan M = \tan \delta' \sec (\alpha - \alpha')$

Then $\cos D = \sin \delta' \cos (M - \delta) \operatorname{cosec} M$

$\alpha = 4^{\text{h}} 30^{\text{m}} 55^{\text{s}}.3$ $\alpha' = 8^{\text{h}} 8^{\text{m}} 7^{\text{s}}.1$ $\alpha - \alpha' = - 3^{\text{h}} 37^{\text{m}} 11^{\text{s}}.8$ $\alpha - \alpha' = - 54^{\circ} 17' 57''$ $\delta' = + 24^{\circ} 52' 46''$ $\tan \delta' = 9.666283$ $\sec (\alpha - \alpha') = 0.233920$ $\tan M = 9.900203$	$M = + 38^{\circ} 28' 27''$ $\delta = + 16^{\circ} 20' 14''$ $M - \delta = + 22^{\circ} 8' 13''$ $\sin \delta' = 9.623983$ $\cos (M - \delta) = 9.966745$ $\operatorname{cosec} M = 0.206097$ $\cos D = 9.796825$ $D = 51^{\circ} 13' 4''$
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EXAMPLE 2.

Find the lunar distance of Venus, February 8, 1913, at 6 P. M. Greenwich Mean Time. In this case the distance is smaller and the following method is more accurate:

Let α and δ = Right Ascension and Declination of the planet

" α' and δ' = " " " " " Moon

D = Lunar distance

Also let $\tan N = \tan \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} \frac{1}{2} (\delta - \delta')$

Then $\sin \frac{1}{2} D = \sin \frac{1}{2} (\alpha - \alpha') \cos \frac{1}{2} (\delta + \delta') \operatorname{cosec} N$

$\alpha = 0^{\text{h}} 20^{\text{m}} 47^{\text{s}}.8$ $\alpha' = 23^{\text{h}} 13^{\text{m}} 24^{\text{s}}.0$ $\alpha - \alpha' = 1^{\text{h}} 7^{\text{m}} 23^{\text{s}}.8$ $\alpha - \alpha' = + 16^{\circ} 50' 57''$ $\delta = + 3^{\circ} 17' 2''$ $\delta' = - 6^{\circ} 39' 6''$ $\delta + \delta' = - 3^{\circ} 22' 4''$ $\delta - \delta' = + 9^{\circ} 56' 8''$ $\frac{1}{2} (\alpha - \alpha') = + 8^{\circ} 25' 28''$ $\frac{1}{2} (\delta + \delta') = - 1^{\circ} 41' 2''$ $\frac{1}{2} (\delta - \delta') = + 4^{\circ} 58' 4''$	$\tan \frac{1}{2} (\alpha - \alpha') = 9.170564$ $\cos \frac{1}{2} (\delta + \delta') = 9.999812$ $\operatorname{cosec} \frac{1}{2} (\delta - \delta') = 1.062505$ $\tan N = 0.232881$ $N = 59^{\circ} 40' 28''$ $\sin \frac{1}{2} (\alpha - \alpha') = 9.165853$ $\cos \frac{1}{2} (\delta + \delta') = 9.999812$ $\operatorname{cosec} N = 0.063903$ $\sin \frac{1}{2} D = 9.229568$ $\frac{1}{2} D = 9^{\circ} 46' 4''$ $D = 19^{\circ} 32' 8''$
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FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913

Reduce the observed altitude of Polaris to the true altitude.
Reduce the recorded time of observation to the local sidereal time.
Take out the App. R. A. and App. Decl. of Polaris for the time of observation (pp. 251-262).
Subtract the App. R. A. from the local sidereal time of observation and the remainder is the hour-angle of Polaris.
With this hour-angle as the vertical argument, and the App. Decl. of Polaris as the horizontal argument, take out the correction from Table I and add it to or subtract it from the true altitude, according to its sign.

For other altitudes than 45°, corrections taken from the supplementary table at the bottom of Table I (Table Ia) may be applied when necessary for the degree of accuracy required.

Example.—1913, October 7, at 10^h 40^m 30^s P. M. local mean solar time, in longitude 59° west of Greenwich, suppose the true altitude of Polaris to be 33° 20' 0'', required the latitude of the place.

Local astronomical mean time	h	m	s
	10	40	30
Reductions from Table III for 10 ^h 40 ^m 30 ^s		+1	45
Greenwich sidereal time of mean noon, October 7, page 111	13	2	6
Reduction from Table III, for longitude (=3 ^h 56 ^m west, or plus)		+0	39
Sum (having regard to signs) is equal to local sidereal time.	23	45	0
R. A. of Polaris (page 260) for time of observation	1	29	15
Remainder is equal to hour-angle of Polaris	22	15	45
Decl. of Polaris (page 260) for time of observation 88° 50' 46''	°	'	''
True altitude	+33	20	0
Correction from Table I	− 1	2	4
Correction from Table Ia			− 3
Latitude of the place	+32	17	53

Observations of Polaris for latitude should be made when practicable, near the times of upper or of lower culminations (hour-angle 0^h or 12^h). However, at sea, if made near elongation (hour-angle 6^h or 18^h), the hour-angle, and hence the local time, should be known within one minute.

Decl. H. A.	88° 50' 20''	88° 50' 30''	88° 50' 40''	88° 50' 50''	88° 51' 0''	88° 51' 10''	Decl. H. A.
h m	' "	' "	' "	' "	' "	' "	h m
0 0	−69 40	−69 30	−69 20	−69 10	−69 0	−68 50	24 0
3	69 39	69 29	69 19	69 9	68 59	68 49	23 57
6	69 38	69 28	69 18	69 8	68 58	68 48	54
9	69 36	69 26	69 16	69 6	68 56	68 46	51
12	69 34	69 24	69 14	69 4	68 54	68 44	48
15	−69 31	−69 21	−69 11	−69 1	−68 51	−68 41	23 45
18	69 27	69 17	69 7	68 57	68 47	68 37	42
21	69 22	69 12	69 2	68 52	68 42	68 32	39
24	69 16	69 6	68 56	68 46	68 36	68 27	36
27	69 10	69 0	68 50	68 40	68 30	68 21	33
30	−69 3	−68 53	−68 43	−68 33	−68 23	−68 14	23 30
33	68 56	68 46	68 36	68 26	68 16	68 6	27
36	68 48	68 38	68 28	68 18	68 8	67 58	24
39	68 39	68 29	68 19	68 9	67 59	67 49	21
42	68 29	68 19	68 9	67 59	67 49	67 39	18
45	−68 18	−68 8	−67 58	−67 48	−67 38	−67 29	23 15
48	68 7	67 57	67 47	67 37	67 27	67 18	12
51	67 55	67 45	67 35	67 25	67 15	67 6	9
54	67 42	67 32	67 22	67 12	67 2	66 53	6
57	67 29	67 19	67 9	66 59	66 49	66 40	3
1 0	−67 15	−67 5	−66 55	−66 45	−66 35	−66 26	23 0
3	67 1	66 51	66 41	66 31	66 21	66 12	22 57
6	66 46	66 36	66 26	66 16	66 6	65 57	54
9	66 29	66 19	66 9	65 59	65 50	65 41	51
12	−66 12	−66 2	−65 52	−65 42	−65 33	−65 24	22 48

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913.

Decl.		88° 50' 20''			88° 50' 30''			88° 50' 40''			88° 50' 50''			88° 51' 0''			88° 51' 10''			Decl.	
H. A.																				H. A.	
h	m	'	''		'	''		'	''		'	''		'	''		'	''	h	m	
1	12	-66	12	18	-66	2	18	-65	52	18	-65	42	17	-65	33	18	-65	24	22	48	
	15	65	54	18	65	44	18	65	34	18	65	25	18	65	15	18	65	6		45	
	18	65	36	19	65	26	19	65	16	19	65	7	19	64	57	18	64	48		42	
	21	65	17	20	65	7	19	64	57	19	64	48	19	64	39	20	64	30		39	
	24	64	57	20	64	48	20	64	38	20	64	29	20	64	19	20	64	10		36	
1	27	-64	37	21	-64	28	21	-64	18	21	-64	9	21	-63	59	20	-63	50	22	33	
	30	64	16	22	64	7	22	63	57	22	63	48	22	63	39	22	63	30		30	
	33	63	54	22	63	45	22	63	35	22	63	26	22	63	17	22	63	8		27	
	36	63	32	23	63	23	23	63	13	23	63	4	23	62	55	23	62	46		24	
	39	63	9	24	63	0	24	62	50	23	62	41	23	62	32	23	62	23		21	
1	42	-62	45	24	-62	36	24	-62	27	24	-62	18	24	-62	9	24	-62	0	22	18	
	45	62	21	25	62	12	25	62	3	25	61	54	25	61	45	25	61	36		15	
	48	61	56	26	61	47	26	61	38	26	61	29	25	61	20	25	61	12		12	
	51	61	30	26	61	21	26	61	12	26	61	4	26	60	55	26	60	46		9	
	54	61	4	27	60	55	27	60	46	27	60	38	27	60	29	27	60	20		6	
1	57	-60	37	28	-60	28	28	-60	19	27	-60	11	27	-60	2	27	-59	54	22	3	
2	0	60	9	28	60	0	28	59	52	28	59	44	28	59	35	28	59	27	22	0	
	3	59	41	29	59	32	29	59	24	29	59	16	29	59	7	29	58	59	21	57	
	6	59	12	29	59	3	29	58	55	29	58	47	29	58	38	29	58	30		54	
	9	58	43	30	58	34	30	58	26	30	58	18	30	58	9	29	58	1		51	
2	12	-58	13	31	-58	4	30	-57	56	30	-57	48	30	-57	40	31	-57	32	21	48	
	15	57	42	31	57	34	31	57	26	31	57	18	31	57	9	31	57	1		45	
	18	57	11	32	57	3	32	56	55	32	56	47	32	56	38	31	56	30		42	
	21	56	39	32	56	31	32	56	23	32	56	15	32	56	7	32	55	59		39	
	24	56	7	33	55	59	33	55	51	33	55	43	33	55	35	33	55	27		36	
2	27	-55	34	34	-55	26	34	-55	18	34	-55	10	33	-55	2	33	-54	54	21	33	
	30	55	0	34	54	52	34	54	44	34	54	37	34	54	29	34	54	21		30	
	33	54	26	35	54	18	35	54	10	35	54	3	35	53	55	35	53	48		27	
	36	53	51	35	53	43	35	53	35	35	53	28	35	53	20	35	53	13		24	
	39	53	16	36	53	8	36	53	0	36	52	53	36	52	46	36	52	39		21	
2	42	-52	40	36	-52	32	36	-52	24	36	-52	17	36	-52	10	36	-52	3	21	18	
	45	52	4	37	51	56	37	51	48	36	51	41	36	51	34	36	51	27		15	
	48	51	27	37	51	19	37	51	12	37	51	5	37	50	58	37	50	51		12	
	51	50	50	38	50	42	38	50	35	38	50	28	38	50	21	38	50	14		9	
	54	50	12	38	50	4	38	49	57	38	49	50	38	49	43	38	49	36		6	
2	57	-49	34	39	-49	26	39	-49	19	38	-49	12	38	-49	5	38	-48	58	21	3	
3	0	48	55	40	48	47	39	48	41	39	48	34	39	48	27	39	48	20	21	0	
	3	48	15	40	48	8	40	48	2	40	47	55	40	47	48	40	47	41	20	57	
	6	47	35	41	47	28	41	47	22	41	47	15	40	47	8	40	47	1		54	
	9	46	54	41	46	47	41	46	41	41	46	35	41	46	28	41	46	22		51	
3	12	-46	13	41	-46	6	41	-46	0	41	-45	54	42	-45	47	41	-45	41	20	48	
	15	45	32	42	45	25	42	45	19	42	45	12	42	45	6	42	45	0		45	
	18	44	50	42	44	43	42	44	37	42	44	30	42	44	24	42	44	18		42	
	21	44	8	43	44	1	43	43	55	43	43	48	42	43	42	42	43	37		39	
	24	43	25	43	43	18	43	43	12	43	43	6	43	43	0	43	42	54		36	
3	27	-42	42	44	-42	35	43	-42	29	43	-42	23	43	-42	17	43	-42	12	20	33	
	30	41	58	44	41	52	44	41	46	44	41	40	44	41	34	44	41	28		30	
	33	41	14	45	41	8	45	41	2	45	40	56	44	40	50	44	40	45		27	
	36	40	29	45	40	23	45	40	18	45	40	12	44	40	6	44	40	1		24	
	39	39	44	46	39	38	45	39	33	45	39	27	45	39	21	45	39	16		21	
3	42	-38	58	46	-38	53	46	-38	48	46	-38	42	45	-38	36	45	-38	31	20	18	
	45	38	12	46	38	7	46	38	2	46	37	57	46	37	51	46	37	46		15	
	48	37	26	46	37	21	46	37	16	46	37	11	46	37	5	46	37	0		12	
	51	36	40	47	36	35	47	36	30	47	36	25	47	36	19	46	36	14		9	
	54	35	53	47	35	48	47	35	43	47	35	38	47	35	33	47	35	28		6	
3	57	-35	6	48	-35	1	48	-34	56	47	-34	51	47	-34	46	47	-34	41	20	3	
4	0	34	18	48	34	13	48	34	9	48	34	4	48	33	59	48	33	54	20	0	
	3	33	30	48	33	25	48	33	21	48	33	16	48	33	11	48	33	7	19	57	
	6	32	42	48	32	37	48	32	33	48	32	28	48	32	23	48	32	19		54	
4	9	-31	53	49	-31	48	49	-31	44	49	-31	40	48	-31	35	48	-31	31	19	51	

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913.

Decl. H. A.		88° 50' 20''	88° 50' 30''	88° 50' 40''	88° 50' 50''	88° 51' 0''	88° 51' 10''	Decl. H. A.	
h	m	'	''	'	''	'	''	h	m
4	9	-31	53	-31	48	-31	44	-31	40
	12	31	4	30	55	30	51	30	46
	15	30	15	30	10	30	6	29	58
	18	29	25	29	20	29	16	29	9
	21	28	35	28	30	28	26	28	19
			50		50		50		50
4	24	-27	45	-27	40	-27	36	-27	33
	27	26	55	26	50	26	46	26	42
	30	26	4	26	0	25	56	25	52
	33	25	13	25	9	25	5	25	1
	36	24	22	24	18	24	14	24	10
			52		52		51		51
4	39	-23	30	-23	26	-23	23	-23	19
	42	22	38	22	34	22	31	22	27
	45	21	46	21	42	21	39	21	36
	48	20	54	20	50	20	47	20	44
	51	20	1	19	58	19	55	19	52
			53		52		52		52
4	54	-19	8	-19	6	-19	3	-19	0
4	57	18	15	18	13	18	11	18	8
5	0	17	22	17	20	17	18	17	15
	3	16	29	16	27	16	25	16	22
	6	15	36	15	34	15	32	15	29
			54		53		53		53
5	9	-14	42	-14	41	-14	39	-14	36
	12	13	48	13	47	13	46	13	43
	15	12	54	12	53	12	52	12	50
	18	12	0	11	59	11	58	11	56
	21	11	6	11	5	11	4	11	2
			54		54		54		54
5	24	-10	12	-10	11	-10	10	-10	8
	27	9	18	9	17	9	16	9	14
	30	8	24	8	23	8	22	8	21
	33	7	30	7	29	7	28	7	27
	36	6	35	6	35	6	34	6	33
			54		54		54		54
5	39	-	5	-	5	-	5	-	5
	42	4	46	4	46	4	45	4	44
	45	3	51	3	51	3	50	3	49
	48	2	56	2	56	2	56	2	55
	51	2	1	2	1	2	1	2	1
			55		55		55		55
5	54	-	1	-	1	-	1	-	1
5	57	-	0	-	0	-	0	-	0
6	0	+	0	+	0	+	0	+	0
	3	1	37	1	37	1	36	1	36
	6	2	31	2	31	2	30	2	30
			55		55		55		55
6	9	+	3	+	3	+	3	+	3
	12	4	20	4	20	4	19	4	18
	15	5	15	5	15	5	14	5	13
	18	6	10	6	9	6	8	6	7
	21	7	4	7	4	7	2	7	1
			55		54		54		54
6	24	+	7	+	7	+	7	+	7
	27	8	54	8	52	8	50	8	49
	30	9	48	9	46	9	44	9	43
	33	10	42	10	40	10	38	10	37
	36	11	36	11	34	11	32	11	30
			54		54		54		54
6	39	+	12	+	12	+	12	+	12
	42	13	24	13	22	13	20	13	18
	45	14	17	14	15	14	13	14	11
	48	15	10	15	8	15	6	15	4
	51	16	3	16	1	15	59	15	57
			53		53		53		52
6	54	+	16	+	16	+	16	+	16
6	57	17	49	17	46	17	44	17	41
7	0	18	42	18	38	18	36	18	33
	3	19	34	19	30	19	28	19	25
	6	+	20	+	20	+	20	+	20
			52		52		52		52

Decl. H. A.		88° 50' 20''	88° 50' 30''	88° 50' 40''	88° 50' 50''	88° 51' 0''	88° 51' 10''	Decl. H. A.	
h	m	' "	' "	' "	' "	' "	' "	h	m
7	6	+20 26 52	+20 22 52	+20 20 52	+20 17 52	+20 14 52	+20 11 52	16	54
	9	21 18 52	21 14 52	21 12 52	21 9 52	21 6 52	21 3 52		51
	12	22 10 52	22 6 52	22 4 52	22 1 52	21 57 51	21 54 51		48
	15	23 2 52	22 58 51	22 55 51	22 52 51	22 48 51	22 45 51		45
	18	23 53 51	23 49 51	23 46 51	23 43 51	23 39 51	23 36 50		42
7	21	+24 44 51	+24 40 51	+24 37 51	+24 34 50	+24 30 50	+24 26 50	16	39
	24	25 35 51	25 31 51	25 28 50	25 24 50	25 20 50	25 16 50		36
	27	26 26 51	26 22 51	26 18 50	26 14 50	26 10 50	26 6 50		33
	30	27 16 50	27 12 50	27 8 50	27 4 50	27 0 50	26 56 50		30
	33	28 6 50	28 2 50	27 58 49	27 53 49	27 49 49	27 45 49		27
7	36	+28 56 49	+28 51 49	+28 47 49	+28 42 49	+28 38 49	+28 34 49	16	24
	39	29 45 49	29 40 49	29 36 49	29 31 49	29 27 49	29 23 49		21
	42	30 34 49	30 29 49	30 25 49	30 20 49	30 16 48	30 12 48		18
	45	31 23 48	31 18 48	31 14 48	31 9 48	31 4 48	31 0 48		15
	48	32 11 48	32 6 48	32 2 48	31 57 48	31 52 48	31 48 48		12
7	51	+32 59 48	+32 54 48	+32 50 47	+32 45 47	+32 40 47	+32 36 47	16	9
	54	33 47 48	33 42 48	33 37 47	33 32 47	33 27 47	33 23 47		6
7	57	34 35 47	34 30 47	34 24 47	34 19 47	34 14 47	34 10 46		3
8	0	35 22 47	35 17 47	35 11 47	35 6 47	35 1 46	34 56 46	16	0
	3	36 9 46	36 4 46	35 58 46	35 53 46	35 47 46	35 42 46	15	57
8	6	+36 55 46	+36 50 46	+36 44 46	+36 39 46	+36 33 46	+36 28 46	15	54
	9	37 41 46	37 36 46	37 30 46	37 25 46	37 19 46	37 14 46		51
	12	38 27 46	38 22 46	38 16 46	38 10 45	38 4 45	37 59 45		48
	15	39 12 45	39 7 45	39 1 45	38 55 44	38 49 44	38 43 44		45
	18	39 57 44	39 52 44	39 45 44	39 39 44	39 33 44	39 28 43		42
8	21	+40 41 44	+40 36 44	+40 29 44	+40 23 43	+40 17 43	+40 11 44	15	39
	24	41 25 44	41 20 44	41 13 43	41 6 43	41 0 43	40 55 43		36
	27	42 9 44	42 3 43	41 56 43	41 49 43	41 43 43	41 38 43		33
	30	42 52 43	42 46 43	42 39 43	42 32 43	42 26 43	42 20 42		30
	33	43 34 42	43 28 42	43 21 42	43 14 42	43 8 42	43 3 41		27
8	36	+44 16 42	+44 10 41	+44 3 42	+43 56 42	+43 50 42	+43 44 42	15	24
	39	44 58 41	44 51 41	44 45 41	44 38 41	44 32 40	44 26 40		21
	42	45 39 41	45 32 41	45 26 41	45 19 41	45 12 41	45 6 41		18
	45	46 20 40	46 13 40	46 7 40	46 0 40	45 53 40	45 47 40		15
	48	47 0 40	46 53 40	46 47 40	46 40 40	46 33 40	46 27 39		12
8	51	+47 40 39	+47 33 39	+47 27 39	+47 20 39	+47 13 39	+47 6 39	15	9
	54	48 19 39	48 12 39	48 6 39	47 59 39	47 52 38	47 45 38		6
8	57	48 58 39	48 51 39	48 45 38	48 38 38	48 30 38	48 23 38		3
9	0	49 37 38	49 30 38	49 23 38	49 16 37	49 8 38	49 1 38	15	0
	3	50 15 38	50 8 37	50 1 37	49 53 37	49 46 37	49 39 37	14	57
9	6	+50 53 37	+50 45 37	+50 38 37	+50 30 36	+50 23 36	+50 16 36	14	54
	9	51 30 36	51 22 36	51 15 36	51 6 36	50 59 36	50 52 36		51
	12	52 6 36	51 58 36	51 51 36	51 42 36	51 35 36	51 28 36		48
	15	52 42 35	52 34 35	52 26 35	52 18 35	52 10 35	52 3 35		45
	18	53 17 35	53 9 35	53 1 35	52 53 34	52 45 34	52 38 34		42
9	21	+53 52 34	+53 44 34	+53 36 34	+53 27 34	+53 19 34	+53 12 34	14	39
	24	54 26 33	54 18 33	54 10 33	54 1 33	53 53 33	53 46 33		36
	27	54 59 33	54 51 33	54 43 33	54 34 33	54 26 33	54 19 33		33
	30	55 32 33	55 24 33	55 16 33	55 7 33	54 59 33	54 52 33		30
	33	56 5 32	55 57 32	55 49 32	55 40 32	55 32 32	55 24 32		27
9	36	+56 37 32	+56 29 32	+56 21 31	+56 12 31	+56 4 31	+55 56 31	14	24
	39	57 9 31	57 1 31	56 52 31	56 43 31	56 35 30	56 27 30		21
	42	57 40 30	57 32 30	57 23 30	57 14 30	57 5 30	56 57 30		18
	45	58 10 29	58 2 29	57 53 29	57 44 29	57 35 29	57 27 29		15
	48	58 39 29	58 31 29	58 22 29	58 13 29	58 4 29	57 56 29		12
9	51	+59 8 28	+59 0 28	+58 51 28	+58 42 28	+58 33 28	+58 25 28	14	9
	54	59 36 28	59 28 27	59 19 27	59 10 27	59 1 27	58 53 27		6
9	57	60 4 27	59 55 27	59 46 27	59 37 27	59 28 27	59 20 27		3
10	0	60 31 26	60 22 26	60 13 26	60 4 26	59 55 26	59 47 26	14	0
10	3	+60 57	+60 48	+60 39	+60 30	+60 21	+60 13	13	57

FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS, 1913.

Decl. H. A.		88° 50' 20''	88° 50' 30''	88° 50' 40''	88° 50' 50''	88° 51' 0''	88° 51' 10''	Decl. H. A.	
h	m	'	''	'	''	'	''	h	m
10	3	+60	57 26	+60	48 26	+60	39 26	+60	30 26
	6	61	23 25	61	14 25	61	5 25	60	56 25
	9	61	48 25	61	39 25	61	21 25	61	47 25
	12	62	13 24	62	4 24	61	30 25	61	12 25
	15	62	37 23	62	28 24	61	55 24	61	37 24
				62	19 23	62	10 24	62	1 24
10	18	+63	0 23	+62	51 23	+62	42 23	+62	33 23
	21	63	23 22	63	14 22	62	56 23	+62	24 23
	24	63	45 22	63	36 22	62	47 22	62	15 23
	27	64	7 21	63	58 21	63	18 21	62	38 23
	30	64	28 20	64	19 20	63	9 21	63	0 22
				64	9 20	63	30 21	63	21 21
10	33	+64	48 20	+64	39 20	+64	29 20	63	42 20
	36	65	8 19	64	59 19	+64	20 20	+64	2 19
	39	65	27 18	65	18 18	64	40 19	64	21 19
	42	65	45 18	65	36 18	64	59 18	64	40 18
	45	66	3 17	65	54 17	65	17 18	64	58 18
				65	44 17	65	7 18	65	15 17
10	48	+66	20 16	+66	11 16	+65	52 16	65	25 17
	51	66	36 16	66	27 15	+65	42 16	+65	32 16
	54	66	52 15	66	42 15	66	8 15	65	48 16
10	57	67	7 14	66	57 14	66	23 15	66	3 15
11	0	67	21 14	67	11 14	66	38 15	66	18 15
				67	1 14	66	28 14	66	32 14
11	3	+67	35 13	+67	25 13	66	52 13	66	42 13
	6	67	48 12	67	38 12	+66	55 13	+66	45 13
	9	68	0 11	67	50 11	67	8 13	66	58 13
	12	68	11 11	68	1 11	67	18 12	67	58 12
	15	68	22 10	68	12 10	67	30 11	67	10 12
				68	2 10	67	41 11	67	22 10
11	18	+68	32 9	+68	22 9	67	52 10	67	32 10
	21	68	41 9	68	31 9	+67	52 9	+67	42 10
	24	68	50 8	68	40 8	68	1 9	67	52 10
	27	68	58 7	68	48 7	68	11 9	68	0 8
	30	69	5 7	68	55 7	68	20 9	68	8 8
				68	45 7	68	10 8	68	8 8
11	33	+69	12 6	+69	2 6	68	18 7	68	15 7
	36	69	18 5	69	8 5	68	25 7	68	32 7
	39	69	23 4	69	13 4	+68	32 6	+68	22 6
	42	69	27 4	69	17 4	68	42 6	68	28 5
	45	69	31 3	69	21 3	68	48 5	68	38 5
				69	11 3	68	53 4	68	33 5
11	48	+69	34 2	+69	24 2	68	57 4	68	38 5
	51	69	36 2	69	26 2	69	1 4	68	41 3
	54	69	38 1	69	28 1	+69	4 3	+68	44 3
11	57	69	39 1	69	29 1	69	6 2	68	54 2
12	0	+69	40 1	+69	30 1	69	8 1	68	56 2
				+69	20 1	69	9 1	68	58 1
						+69	10 1	68	59 1
								+69	0 1
								+68	50 1

TABLE Ia.

Table I has been computed for an altitude of 45°. For other altitudes, corrections taken from the following table may be applied when the desired degree of accuracy requires it.

Altitude. H. A.		10°	20°	30°	40°	50°	60°	70°	Altitude. H. A.	
h	h	''	''	''	''	''	''	''	h	h
0	12	0	0	0	0	0	0	0	12	24
1	11	- 3	- 2	- 2	- 1	0	+ 2	+ 5	13	23
2	10	9	7	5	2	+ 2	8	18	14	22
3	9	17	13	9	4	4	16	36	15	21
4	8	26	20	13	5	6	24	55	16	20
5	7	32	25	16	7	8	28	68	17	19
6	6	-35	-27	-18	-7	+8	+30	+73	18	18

TABLE
TO BE

INTO MEAN SOLAR TIME.
FROM A SIDEREAL TIME

687

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TO BE

FROM A SIDEREAL TIME ~~11:24~~

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	O ^h	I ^h	2 ^h	3 ^h	4 ^h	5 ^h	6 ^h	7 ^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	I 8.995	0	0.000
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	I 9.160	1	0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	I 9.324	2	0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	I 9.488	3	0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	I 9.652	4	0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	I 9.817	5	0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	I 0.124	I 9.981	6	0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	I 0.289	I 10.145	7	0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	I 0.453	I 10.310	8	0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	I 0.617	I 10.474	9	0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	I 0.782	I 10.638	10	0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	I 0.946	I 10.802	11	0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	I 1.110	I 10.967	12	0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	I 1.274	I 11.131	13	0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	I 1.439	I 11.295	14	0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	I 1.603	I 11.459	15	0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	I 1.767	I 11.624	16	0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	I 1.932	I 11.788	17	0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	I 2.096	I 11.952	18	0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	I 2.260	I 12.117	19	0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	I 2.424	I 12.281	20	0.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	I 2.589	I 12.445	21	0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	I 2.753	I 12.609	22	0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	I 2.917	I 12.774	23	0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	I 3.081	I 12.938	24	0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	I 3.246	I 13.102	25	0.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	I 3.410	I 13.266	26	0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	I 3.574	I 13.431	27	0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	I 3.739	I 13.595	28	0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	I 3.903	I 13.759	29	0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	I 4.067	I 13.924	30	0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	I 4.231	I 14.088	31	0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	I 4.396	I 14.252	32	0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	I 4.560	I 14.416	33	0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	I 4.724	I 14.581	34	0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	I 4.888	I 14.745	35	0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	I 5.053	I 14.909	36	0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	I 5.217	I 15.073	37	0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	I 5.381	I 15.238	38	0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	I 5.546	I 15.402	39	0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	I 5.710	I 15.566	40	0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	I 5.874	I 15.731	41	0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	I 6.038	I 15.895	42	0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	I 6.203	I 16.059	43	0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	I 6.367	I 16.223	44	0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	I 6.531	I 16.388	45	0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	I 6.695	I 16.552	46	0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	I 6.860	I 16.716	47	0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	I 7.024	I 16.881	48	0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	I 7.188	I 17.045	49	0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	I 7.353	I 17.209	50	0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	I 7.517	I 17.373	51	0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	I 7.681	I 17.538	52	0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	I 7.845	I 17.702	53	0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	I 8.010	I 17.866	54	0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	I 8.174	I 18.030	55	0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	I 8.338	I 18.195	56	0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	I 8.502	I 18.359	57	0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	I 8.667	I 18.523	58	0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	I 8.831	I 18.688	59	0.162
Mean Solar.	O ^h	I ^h	2 ^h	3 ^h	4 ^h	5 ^h	6 ^h	7 ^h	For Seconds.	

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	16 ^h	17 ^h	18 ^h	19 ^h	20 ^h	21 ^h	22 ^h	23 ^h	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0	0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1	0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2	0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3	0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4	0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5	0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6	0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7	0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8	0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9	0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10	0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11	0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12	0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13	0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14	0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15	0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16	0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17	0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18	0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19	0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20	0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21	0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22	0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23	0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24	0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25	0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26	0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27	0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28	0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29	0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30	0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31	0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32	0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33	0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34	0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35	0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36	0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37	0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38	0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39	0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40	0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41	0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42	0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43	0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44	0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45	0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46	0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47	0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48	0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49	0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50	0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51	0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52	0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53	0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54	0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55	0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56	0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57	0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58	0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59	0.162
Mean Solar.	16 ^h	17 ^h	18 ^h	19 ^h	20 ^h	21 ^h	22 ^h	23 ^h	For Seconds.	

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1913.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat. H. A.		10°	15°	20°	25°	30°	35°	40°	45°	50°	Lat. H. A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
0	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	24	0
	12	0	3.7	0	3.8	0	4.0	0	4.2	0	4.5	23	48
	24	0	7.3	0	7.5	0	7.8	0	8.1	0	8.5		36
	36	0	11.0	0	11.3	0	11.6	0	12.1	0	12.7		24
	48	0	14.7	0	15.0	0	15.5	0	16.0	0	16.8		12
1	0	0	18.2	0	18.7	0	19.2	0	20.0	0	20.9	23	0
	12	0	21.8	0	22.3	0	22.9	0	23.8	0	25.0	22	48
	24	0	25.2	0	25.8	0	26.6	0	27.6	0	29.0		36
	36	0	28.7	0	29.3	0	30.2	0	31.4	0	32.9		24
	48	0	32.0	0	32.7	0	33.7	0	35.0	0	36.7		12
2	0	0	35.3	0	36.0	0	37.1	0	38.5	0	40.4	22	0
	12	0	38.4	0	39.2	0	40.4	0	42.0	0	44.0	21	48
	24	0	41.5	0	42.3	0	43.6	0	45.3	0	47.5		36
	36	0	44.4	0	45.3	0	46.7	0	48.5	0	50.8		24
	48	0	47.2	0	48.2	0	49.6	0	51.5	0	54.0		12
3	0	0	49.8	0	50.9	0	52.4	0	54.4	0	57.0	21	0
	12	0	52.4	0	53.5	0	55.1	0	57.2	0	59.9	20	48
	24	0	54.8	0	55.9	0	57.6	0	59.8	1	2.6		36
	36	0	57.0	0	58.2	0	59.9	1	2.2	1	5.2		24
	48	0	59.1	1	0.3	1	2.1	1	4.4	1	7.5		12
4	0	1	1.0	1	2.3	1	4.1	1	6.5	1	9.7	20	0
	12	1	2.8	1	4.1	1	5.9	1	8.4	1	11.6	19	48
	24	1	4.3	1	5.7	1	7.5	1	10.1	1	13.4		36
	36	1	5.7	1	7.1	1	9.0	1	11.6	1	15.0		24
	48	1	7.0	1	8.3	1	10.3	1	12.9	1	16.3		12
5	0	1	8.0	1	9.4	1	11.3	1	14.0	1	17.5	19	0
	12	1	8.8	1	10.2	1	12.2	1	14.9	1	18.4	18	48
	24	1	9.5	1	10.9	1	12.9	1	15.6	1	19.1		36
	36	1	10.0	1	11.4	1	13.4	1	16.1	1	19.6		24
	48	1	10.3	1	11.6	1	13.6	1	16.4	1	19.9		12
6	0	1	10.3	1	11.7	1	13.7	1	16.4	1	20.0	18	0
	12	1	10.3	1	11.6	1	13.6	1	16.3	1	19.8	17	48
	24	1	10.0	1	11.3	1	13.3	1	15.9	1	19.5		36
	36	1	9.4	1	10.8	1	12.7	1	15.4	1	18.9		24
	48	1	8.8	1	10.1	1	12.0	1	14.6	1	18.0		12
7	0	1	7.8	1	9.2	1	11.1	1	13.6	1	17.0	17	0
	12	1	6.8	1	8.1	1	10.0	1	12.5	1	15.8	16	48
	24	1	5.5	1	6.8	1	8.6	1	11.1	1	14.4		36
	36	1	4.2	1	5.4	1	7.1	1	9.6	1	12.7		24
	48	1	2.6	1	3.7	1	5.5	1	7.8	1	10.9		12
8	0	1	0.8	1	1.9	1	3.6	1	5.9	1	8.9	16	0
	12	0	58.9	1	0.0	1	1.6	1	3.8	1	6.7	15	48
	24	0	56.8	0	57.8	0	59.4	1	1.5	1	4.3		36
	36	0	54.5	0	55.5	0	57.0	0	59.1	1	1.7		24
	48	0	52.2	0	53.1	0	54.5	0	56.4	0	59.0		12
9	0	0	49.6	0	50.5	0	51.9	0	53.7	0	56.1	15	0
	12	0	46.9	0	47.8	0	49.1	0	50.8	0	53.1	14	48
	24	0	44.2	0	44.9	0	46.1	0	47.8	0	49.9		36
	36	0	41.2	0	42.0	0	43.1	0	44.6	0	46.6		24
	48	0	38.2	0	38.9	0	39.9	0	41.3	0	43.1		12
10	0	0	35.1	0	35.7	0	36.6	0	37.9	0	39.6	14	0
	12	0	31.8	0	32.4	0	33.3	0	34.4	0	35.9	13	48
	24	0	28.5	0	29.0	0	29.8	0	30.8	0	32.2		36
	36	0	25.2	0	25.6	0	26.2	0	27.2	0	28.4		24
	48	0	21.7	0	22.1	0	22.6	0	23.4	0	24.5		12
11	0	0	18.2	0	18.5	0	18.9	0	19.6	0	20.5	13	0
	12	0	14.6	0	14.8	0	15.2	0	15.7	0	16.4	12	48
	24	0	11.0	0	11.2	0	11.5	0	11.8	0	12.4		36
	36	0	7.3	0	7.5	0	7.7	0	7.9	0	8.3		24
	48	0	3.7	0	3.7	0	3.8	0	4.0	0	4.1		12
12	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	12	0

AZIMUTH OF POLARIS AT ALL HOUR ANGLES, 1913.

[For hour angles 0^h to 12^h the star is west of north, and for hour angles 12^h to 24^h it is east of north.]

Lat. H. A.		52°	54°	56°	58°	60°	61°	62°	63°	64°	Lat. H. A.		
h	m	°	'	°	'	°	'	°	'	°	'	h	m
0	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	24	0
	12	0	6.1	0	6.3	0	7.1	0	7.5	0	7.8	23	48
	24	0	12.1	0	12.7	0	13.3	0	14.1	0	15.0		36
	36	0	18.2	0	19.0	0	20.0	0	21.1	0	22.5		24
	48	0	24.0	0	25.2	0	26.5	0	28.1	0	29.8		12
1	0	0	29.9	0	31.3	0	33.0	0	34.9	0	37.1	23	0
	12	0	35.6	0	37.4	0	39.4	0	41.7	0	44.3	22	48
	24	0	41.3	0	43.4	0	45.7	0	48.3	0	51.3		36
	36	0	46.9	0	49.2	0	51.8	0	54.8	0	58.2		24
	48	0	52.3	0	54.9	0	57.8	1	1.1	1	4.9		12
2	0	0	57.5	1	0.4	1	3.6	1	7.2	1	11.4	22	0
	12	1	2.6	1	5.7	1	9.2	1	13.2	1	17.7	21	48
	24	1	7.5	1	10.9	1	14.6	1	18.9	1	23.8		36
	36	1	12.3	1	15.8	1	19.8	1	24.4	1	29.6		24
	48	1	16.8	1	20.5	1	24.8	1	29.6	1	35.2		12
3	0	1	21.0	1	25.0	1	29.5	1	34.6	1	40.4	21	0
	12	1	25.1	1	29.2	1	33.9	1	39.3	1	45.4	20	48
	24	1	28.9	1	33.2	1	38.1	1	43.7	1	50.1		36
	36	1	32.4	1	36.9	1	42.0	1	47.8	1	54.4		24
	48	1	35.7	1	40.3	1	45.6	1	51.6	1	58.4		12
4	0	1	38.7	1	43.5	1	48.9	1	55.0	2	2.1	20	0
	12	1	41.4	1	46.3	1	51.9	1	58.2	2	5.4	19	48
	24	1	43.9	1	48.9	1	54.5	2	1.0	2	8.3		36
	36	1	46.0	1	51.1	1	56.9	2	3.4	2	10.9		24
	48	1	47.9	1	53.0	1	58.9	2	5.5	2	13.2		12
5	0	1	49.4	1	54.6	2	0.6	2	7.3	2	15.0	19	0
	12	1	50.6	1	55.9	2	1.9	2	8.7	2	16.5	18	48
	24	1	51.6	1	56.9	2	2.9	2	9.7	2	17.5		36
	36	1	52.2	1	57.5	2	3.6	2	10.4	2	18.2		24
	48	1	52.5	1	57.8	2	3.9	2	10.7	2	18.6		12
6	0	1	52.5	1	57.8	2	3.8	2	10.7	2	18.5	18	0
	12	1	52.2	1	57.5	2	3.5	2	10.3	2	18.0	17	48
	24	1	51.6	1	56.8	2	2.8	2	9.5	2	17.2		36
	36	1	50.7	1	55.9	2	1.7	2	8.4	2	16.0		24
	48	1	49.4	1	54.6	2	0.4	2	7.0	2	14.5		12
7	0	1	47.9	1	53.0	1	58.7	2	5.2	2	12.6	17	0
	12	1	46.1	1	51.1	1	56.7	2	3.1	2	10.3	16	48
	24	1	44.1	1	48.9	1	54.4	2	0.6	2	7.7		36
	36	1	41.7	1	46.4	1	51.8	1	57.8	2	4.8		24
	48	1	39.1	1	43.7	1	48.9	1	54.8	2	1.5		12
8	0	1	36.2	1	40.7	1	45.7	1	51.4	1	57.9	16	0
	12	1	33.0	1	37.4	1	42.2	1	47.7	1	54.0	15	48
	24	1	29.7	1	33.8	1	38.5	1	43.8	1	49.8		36
	36	1	26.0	1	30.0	1	34.5	1	39.6	1	45.3		24
	48	1	22.2	1	26.0	1	30.2	1	35.1	1	40.6		12
9	0	1	18.1	1	21.7	1	25.8	1	30.4	1	35.6	15	0
	12	1	13.9	1	17.3	1	21.1	1	25.4	1	30.4	14	48
	24	1	9.4	1	12.6	1	16.2	1	20.3	1	24.9		36
	36	1	4.8	1	7.8	1	11.1	1	14.9	1	19.2		24
	48	1	0.0	1	2.7	1	5.8	1	9.3	1	13.3		12
10	0	0	55.0	0	57.5	1	0.4	1	3.6	1	7.2	14	0
	12	0	49.9	0	52.2	0	54.8	0	57.7	1	1.0	13	48
	24	0	44.7	0	46.8	0	49.1	0	51.7	0	54.6		36
	36	0	39.4	0	41.2	0	43.2	0	45.5	0	48.1		24
	48	0	33.9	0	35.5	0	37.2	0	39.2	0	41.4		12
11	0	0	28.4	0	29.7	0	31.2	0	32.8	0	34.7	13	0
	12	0	22.8	0	23.9	0	25.0	0	26.4	0	27.9	12	48
	24	0	17.2	0	17.9	0	18.8	0	19.8	0	21.0		36
	36	0	11.5	0	12.0	0	12.6	0	13.3	0	14.0		24
	48	0	5.7	0	6.0	0	6.3	0	6.6	0	7.0		12
12	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	12	0

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Decl. Lat.							Variation for—	
	88° 50' 20''	88° 50' 30''	88° 50' 40''	88° 50' 50''	88° 51' 0''	88° 51' 10''	r' of Lat.	r'' of δ.
° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	"	"
5 0	1 9 56.0	1 9 45.9	1 9 35.9	1 9 25.9	1 9 15.8	1 9 5.8	+0.11	−1.00
5 20	1 9 58.2	1 9 48.1	1 9 38.1	1 9 28.0	1 9 18.0	1 9 8.0	0.12	1.00
5 40	1 10 0.5	1 9 50.4	1 9 40.4	1 9 30.4	1 9 20.3	1 9 10.3	0.12	1.00
6 0	1 10 3.0	1 9 52.9	1 9 42.9	1 9 32.9	1 9 22.8	1 9 12.8	0.13	1.00
6 20	1 10 5.7	1 9 55.6	1 9 45.6	1 9 35.5	1 9 25.4	1 9 15.4	0.14	1.01
6 40	1 10 8.5	1 9 58.4	1 9 48.3	1 9 38.3	1 9 28.2	1 9 18.1	+0.14	−1.01
7 0	1 10 11.4	1 10 1.3	1 9 51.2	1 9 41.2	1 9 31.1	1 9 21.0	0.15	1.01
7 20	1 10 14.5	1 10 4.4	1 9 54.3	1 9 44.2	1 9 34.1	1 9 24.1	0.15	1.01
7 40	1 10 17.7	1 10 7.6	1 9 57.5	1 9 47.4	1 9 37.3	1 9 27.3	0.16	1.01
8 0	1 10 21.1	1 10 11.0	1 10 0.9	1 9 50.8	1 9 40.7	1 9 30.6	0.17	1.01
8 20	1 10 24.6	1 10 14.5	1 10 4.4	1 9 54.3	1 9 44.2	1 9 34.1	+0.18	−1.01
8 40	1 10 28.3	1 10 18.2	1 10 8.1	1 9 57.9	1 9 47.8	1 9 37.7	0.19	1.01
9 0	1 10 32.1	1 10 22.0	1 10 11.9	1 10 1.7	1 9 51.6	1 9 41.5	0.20	1.01
9 20	1 10 36.1	1 10 26.0	1 10 15.8	1 10 5.7	1 9 55.5	1 9 45.4	0.20	1.01
9 40	1 10 40.2	1 10 30.1	1 10 19.9	1 10 9.8	1 9 59.6	1 9 49.5	0.21	1.01
10 0	1 10 44.5	1 10 34.3	1 10 24.2	1 10 14.0	1 10 3.8	1 9 53.7	+0.22	−1.02
10 20	1 10 48.9	1 10 38.7	1 10 28.6	1 10 18.4	1 10 8.2	1 9 58.1	0.23	1.02
10 40	1 10 53.5	1 10 43.3	1 10 33.1	1 10 23.0	1 10 12.8	1 10 2.6	0.23	1.02
11 0	1 10 58.2	1 10 48.0	1 10 37.8	1 10 27.7	1 10 17.5	1 10 7.3	0.24	1.02
11 20	1 11 3.1	1 10 52.9	1 10 42.7	1 10 32.5	1 10 22.3	1 10 12.1	0.25	1.02
11 40	1 11 8.2	1 10 57.9	1 10 47.7	1 10 37.5	1 10 27.3	1 10 17.1	+0.26	−1.02
12 0	1 11 13.4	1 11 3.1	1 10 52.9	1 10 42.7	1 10 32.5	1 10 22.3	0.26	1.02
12 20	1 11 18.7	1 11 8.5	1 10 58.3	1 10 48.0	1 10 37.8	1 10 27.6	0.27	1.02
12 40	1 11 24.3	1 11 14.0	1 11 3.8	1 10 53.5	1 10 43.2	1 10 33.0	0.28	1.03
13 0	1 11 30.0	1 11 19.7	1 11 9.4	1 10 59.2	1 10 49.0	1 10 38.7	0.29	1.03
13 20	1 11 35.8	1 11 25.5	1 11 15.2	1 11 5.0	1 10 54.7	1 10 44.4	+0.30	−1.03
13 40	1 11 41.8	1 11 31.5	1 11 21.2	1 11 10.9	1 11 0.6	1 10 50.4	0.31	1.03
14 0	1 11 48.0	1 11 37.7	1 11 27.4	1 11 17.0	1 11 6.7	1 10 56.5	0.31	1.03
14 20	1 11 54.3	1 11 44.0	1 11 33.7	1 11 23.3	1 11 13.0	1 11 2.7	0.32	1.03
14 40	1 12 0.8	1 11 50.5	1 11 40.1	1 11 29.8	1 11 19.4	1 11 9.1	0.33	1.03
15 0	1 12 7.5	1 11 57.1	1 11 46.7	1 11 36.4	1 11 26.0	1 11 15.7	+0.34	−1.04
15 20	1 12 14.3	1 12 3.9	1 11 53.5	1 11 43.2	1 11 32.8	1 11 22.5	0.34	1.04
15 40	1 12 21.3	1 12 10.9	1 12 0.5	1 11 50.1	1 11 39.7	1 11 29.4	0.35	1.04
16 0	1 12 28.5	1 12 18.0	1 12 7.6	1 11 57.2	1 11 46.8	1 11 36.5	0.36	1.04
16 20	1 12 35.8	1 12 25.4	1 12 14.9	1 12 4.5	1 11 54.1	1 11 43.7	0.37	1.04
16 40	1 12 43.3	1 12 32.9	1 12 22.4	1 12 12.0	1 12 1.5	1 11 51.1	+0.38	−1.04
17 0	1 12 51.0	1 12 40.5	1 12 30.1	1 12 19.6	1 12 9.2	1 11 58.7	0.39	1.05
17 20	1 12 58.9	1 12 48.4	1 12 37.9	1 12 27.4	1 12 16.9	1 12 6.5	0.40	1.05
17 40	1 13 6.9	1 12 56.4	1 12 45.9	1 12 35.4	1 12 24.9	1 12 14.4	0.40	1.05
18 0	1 13 15.1	1 13 4.6	1 12 54.1	1 12 43.6	1 12 33.1	1 12 22.6	0.41	1.05
18 20	1 13 23.5	1 13 13.0	1 13 2.5	1 12 51.9	1 12 41.4	1 12 30.9	+0.42	−1.05
18 40	1 13 32.1	1 13 21.6	1 13 11.0	1 13 0.5	1 12 50.0	1 12 39.4	0.43	1.06
19 0	1 13 40.9	1 13 30.3	1 13 19.7	1 13 9.2	1 12 58.6	1 12 48.0	0.44	1.06
19 20	1 13 49.9	1 13 39.2	1 13 28.6	1 13 18.0	1 13 7.4	1 12 56.8	0.45	1.06
19 40	1 13 59.0	1 13 48.3	1 13 37.7	1 13 27.1	1 13 16.5	1 13 5.9	0.46	1.06
20 0	1 14 8.3	1 13 57.6	1 13 47.0	1 13 36.4	1 13 25.7	1 13 15.1	+0.47	−1.06
20 20	1 14 17.8	1 14 7.1	1 13 56.5	1 13 45.8	1 13 35.2	1 13 24.5	0.48	1.07
20 40	1 14 27.5	1 14 16.8	1 14 6.1	1 13 55.4	1 13 44.7	1 13 34.1	0.49	1.07
21 0	1 14 37.4	1 14 26.7	1 14 16.0	1 14 5.3	1 13 54.6	1 13 43.9	0.50	1.07
21 20	1 14 47.5	1 14 36.8	1 14 26.0	1 14 15.3	1 14 4.6	1 13 53.9	0.51	1.07
21 40	1 14 57.8	1 14 47.0	1 14 36.3	1 14 25.5	1 14 14.7	1 14 4.0	+0.52	−1.08
22 0	1 15 8.3	1 14 57.5	1 14 46.7	1 14 36.0	1 14 25.2	1 14 14.4	0.53	1.08
22 20	1 15 19.0	1 15 8.2	1 14 57.4	1 14 46.6	1 14 35.8	1 14 25.0	0.54	1.08
22 40	1 15 29.9	1 15 19.1	1 15 8.2	1 14 57.4	1 14 46.5	1 14 35.7	0.55	1.08
23 0	1 15 41.0	1 15 30.2	1 15 19.3	1 15 8.4	1 14 57.5	1 14 46.7	0.56	1.09
23 20	1 15 52.4	1 15 41.5	1 15 30.6	1 15 19.7	1 15 8.8	1 14 57.9	+0.57	−1.09
23 40	1 16 3.9	1 15 53.0	1 15 42.0	1 15 31.1	1 15 20.2	1 15 9.3	0.58	1.09
24 0	1 16 15.6	1 16 4.7	1 15 53.7	1 15 42.8	1 15 31.8	1 15 20.9	0.59	1.09
24 20	1 16 27.6	1 16 16.6	1 16 5.6	1 15 54.7	1 15 43.7	1 15 32.7	0.60	1.10
24 40	1 16 39.8	1 16 28.7	1 16 17.7	1 16 6.8	1 15 55.8	1 15 44.8	0.61	1.10
25 0	1 16 52.2	1 16 41.1	1 16 30.1	1 16 19.1	1 16 8.0	1 15 57.0	+0.62	−1.10

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Decl. Lat.	88° 50' 20''			88° 50' 30''			88° 50' 40''			88° 50' 50''			88° 51' 0''			88° 51' 10''			Variation for—																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	"	"																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
25 0	1 16 52.2	1 16 41.1	1 16 30.1	1 16 19.1	1 16 8.0	1 15 57.0	+0.62	-1.10	25 20	1 17 4.8	1 16 53.7	1 16 42.7	1 16 31.6	1 16 20.5	1 16 9.5	0.64	1.11	25 40	1 17 17.7	1 17 6.6	1 16 55.5	1 16 44.4	1 16 33.3	1 16 22.2	0.65	1.11	26 0	1 17 30.7	1 17 19.6	1 17 8.5	1 16 57.4	1 16 46.2	1 16 35.1	0.66	1.11	26 20	1 17 44.0	1 17 32.9	1 17 21.7	1 17 10.6	1 16 59.4	1 16 48.3	0.67	1.12	26 40	1 17 57.6	1 17 46.4	1 17 35.2	1 17 24.0	1 17 12.8	1 17 1.7	+0.68	-1.12	27 0	1 18 11.4	1 18 0.2	1 17 48.9	1 17 37.7	1 17 26.5	1 17 15.3	0.70	1.12	27 20	1 18 25.4	1 18 14.2	1 18 2.9	1 17 51.6	1 17 40.4	1 17 29.2	0.71	1.13	27 40	1 18 39.7	1 18 28.4	1 18 17.1	1 18 5.8	1 17 54.5	1 17 43.3	0.72	1.13	28 0	1 18 54.2	1 18 42.9	1 18 31.6	1 18 20.2	1 18 8.9	1 17 57.6	0.73	1.13	28 20	1 19 9.0	1 18 57.6	1 18 46.3	1 18 34.9	1 18 23.5	1 18 12.2	+0.74	-1.14	28 40	1 19 24.0	1 19 12.6	1 19 1.2	1 18 49.8	1 18 38.4	1 18 27.0	0.75	1.14	29 0	1 19 39.3	1 19 27.9	1 19 16.4	1 19 5.0	1 18 53.6	1 18 42.2	0.77	1.14	29 20	1 19 54.8	1 19 43.4	1 19 31.9	1 19 20.4	1 19 8.9	1 18 57.5	0.78	1.15	29 40	1 20 10.7	1 19 59.2	1 19 47.6	1 19 36.1	1 19 24.6	1 19 13.1	0.80	1.15	30 0	1 20 26.7	1 20 15.2	1 20 3.6	1 19 52.1	1 19 40.5	1 19 29.0	+0.81	-1.15	30 10	1 20 34.8	1 20 23.3	1 20 11.7	1 20 0.1	1 19 48.6	1 19 37.1	0.82	1.16	30 20	1 20 43.0	1 20 31.5	1 20 19.9	1 20 8.3	1 19 56.7	1 19 45.2	0.82	1.16	30 30	1 20 51.3	1 20 39.7	1 20 28.1	1 20 16.5	1 20 4.9	1 19 53.4	0.83	1.16	30 40	1 20 59.7	1 20 48.1	1 20 36.4	1 20 24.8	1 20 13.2	1 20 1.6	0.84	1.16	30 50	1 21 8.2	1 20 56.5	1 20 44.8	1 20 33.1	1 20 21.5	1 20 9.9	+0.85	-1.16	31 0	1 21 16.7	1 21 5.0	1 20 53.3	1 20 41.6	1 20 30.0	1 20 18.3	0.85	1.17	31 10	1 21 25.3	1 21 13.5	1 21 1.8	1 20 50.1	1 20 38.4	1 20 26.8	0.86	1.17	31 20	1 21 33.9	1 21 22.1	1 21 10.4	1 20 58.7	1 20 47.0	1 20 35.3	0.87	1.17	31 30	1 21 42.6	1 21 30.8	1 21 19.1	1 21 7.4	1 20 55.6	1 20 43.9	0.88	1.17	31 40	1 21 51.3	1 21 39.6	1 21 27.8	1 21 16.1	1 21 4.3	1 20 52.6	+0.88	-1.18	31 50	1 22 0.2	1 21 48.4	1 21 36.6	1 21 24.8	1 21 13.0	1 21 1.3	0.89	1.18	32 0	1 22 9.1	1 21 57.3	1 21 45.5	1 21 33.7	1 21 21.9	1 21 10.1	0.90	1.18	32 10	1 22 18.1	1 22 6.3	1 21 54.5	1 21 42.7	1 21 30.8	1 21 19.0	0.90	1.18	32 20	1 22 27.2	1 22 15.3	1 22 3.5	1 21 51.7	1 21 39.8	1 21 28.0	0.91	1.18	32 30	1 22 36.3	1 22 24.5	1 22 12.6	1 22 0.8	1 21 48.9	1 21 37.0	+0.92	-1.19	32 40	1 22 45.5	1 22 33.7	1 22 21.8	1 22 9.9	1 21 58.0	1 21 46.1	0.93	1.19	32 50	1 22 54.8	1 22 43.0	1 22 31.1	1 22 19.2	1 22 7.2	1 21 55.3	0.93	1.19	33 0	1 23 4.2	1 22 52.3	1 22 40.4	1 22 28.5	1 22 16.5	1 22 4.6	0.94	1.19	33 10	1 23 13.7	1 23 1.8	1 22 49.8	1 22 37.9	1 22 25.9	1 22 13.9	0.95	1.20	33 20	1 23 23.2	1 23 11.3	1 22 59.3	1 22 47.3	1 22 35.3	1 22 23.4	+0.96	-1.20	33 30	1 23 32.9	1 23 20.9	1 23 8.9	1 22 56.9	1 22 44.9	1 22 32.9	0.96	1.20	33 40	1 23 42.6	1 23 30.5	1 23 18.5	1 23 6.5	1 22 54.4	1 22 42.4	0.97	1.20	33 50	1 23 52.3	1 23 40.3	1 23 28.2	1 23 16.2	1 23 4.2	1 22 52.1	0.98	1.20	34 0	1 24 2.2	1 23 50.1	1 23 38.0	1 23 26.0	1 23 13.9	1 23 1.8	0.99	1.21	34 10	1 24 12.2	1 24 0.0	1 23 47.9	1 23 35.8	1 23 23.7	1 23 11.7	+1.00	-1.21	34 20	1 24 22.2	1 24 10.0	1 23 57.9	1 23 45.8	1 23 33.7	1 23 21.6	1.00	1.21	34 30	1 24 32.3	1 24 20.1	1 24 8.0	1 23 55.9	1 23 43.7	1 23 31.5	1.01	1.21	34 40	1 24 42.4	1 24 30.3	1 24 18.1	1 24 6.0	1 23 53.8	1 23 41.6	1.02	1.22	34 50	1 24 52.7	1 24 40.5	1 24 28.3	1 24 16.1	1 24 3.9	1 23 51.7	1.03	1.22	35 0	1 25 3.0	1 24 50.8	1 24 38.6	1 24 26.4	1 24 14.2	1 24 2.0	+1.04	-1.22	35 10	1 25 13.4	1 25 1.2	1 24 49.0	1 24 36.8	1 24 24.5	1 24 12.3	1.05	1.22	35 20	1 25 24.0	1 25 11.7	1 24 59.5	1 24 47.3	1 24 35.0	1 24 22.7	1.06	1.23	35 30	1 25 34.6	1 25 22.3	1 25 10.1	1 24 57.8	1 24 45.5	1 24 33.2	1.06	1.23	35 40	1 25 45.3	1 25 33.0	1 25 20.7	1 25 8.4	1 24 56.0	1 24 43.7	1.07	1.23	35 50	1 25 56.1	1 25 43.8	1 25 31.4	1 25 19.1	1 25 6.7	1 24 54.4	+1.08	-1.23	36 0	1 26 7.0	1 25 54.6	1 25 42.2	1 25 29.9	1 25 17.5	1 25 5.1	1.09	1.24	36 10	1 26 18.0	1 26 5.5	1 25 53.1	1 25 40.7	1 25 28.3	1 25 16.0	1.10	1.24	36 20	1 26 29.0	1 26 16.5	1 26 4.1	1 25 51.7	1 25 39.3	1 25 26.9	1.11	1.24	36 30	1 26 40.1	1 26 27.6	1 26 15.2	1 26 2.8	1 25 50.3	1 25 37.9	1.12	1.24	36 40	1 26 51.3	1 26 38.9	1 26 26.4	1 26 14.0	1 26 1.5	1 25 49.0	+1.13	-1.25	36 50	1 27 2.7	1 26 50.2	1 26 37.7	1 26 25.2	1 26 12.7	1 26 0.2	1.14	1.25	37 0	1 27 14.1	1 27 1.6	1 26 49.1	1 26 36.6	1 26 24.0	1 26 11.5	1.15	1.25	37 10	1 27 25.6	1 27 13.1	1 27 0.6	1 26 48.1	1 26 35.5	1 26 22.9	1.15	1.25	37 20	1 27 37.2	1 27 24.7	1 27 12.1	1 26 59.6	1 26 47.0	1 26 34.4	1.16	1.26	37 30	1 27 48.9	1 27 36.3	1 27 23.7	1 27 11.1	1 26 58.5	1 26 46.0	+1.17	-1.26

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Decl. Lat.		88° 50' 20''		88° 50' 30''		88° 50' 40''		88° 50' 50''		88° 51' 0''		88° 51' 10''		Variation for—	
														r' of Lat.	r'' of δ.
°	'	°	'	°	'	°	'	°	'	°	'	°	'	''	''
37	30	1	27	1	27	1	27	1	27	1	26	1	26	+1.17	−1.26
37	40	1	28	1	27	1	27	1	27	1	27	1	26	1.18	1.26
37	50	1	28	1	28	1	27	1	27	1	27	1	27	1.19	1.27
38	0	1	28	1	28	1	27	1	27	1	27	1	27	1.20	1.27
38	10	1	28	1	28	1	28	1	27	1	27	1	27	1.21	1.27
38	20	1	28	1	28	1	28	1	28	1	27	1	27	+1.22	−1.27
38	30	1	29	1	28	1	28	1	28	1	28	1	27	1.23	1.28
38	40	1	29	1	29	1	28	1	28	1	28	1	28	1.24	1.28
38	50	1	29	1	29	1	29	1	28	1	28	1	28	1.25	1.28
39	0	1	29	1	29	1	29	1	29	1	28	1	28	1.26	1.29
39	10	1	29	1	29	1	29	1	29	1	29	1	28	+1.27	−1.29
39	20	1	30	1	29	1	29	1	29	1	29	1	28	1.28	1.29
39	30	1	30	1	30	1	29	1	29	1	29	1	29	1.30	1.30
39	40	1	30	1	30	1	30	1	29	1	29	1	29	1.31	1.30
39	50	1	30	1	30	1	30	1	30	1	29	1	29	1.32	1.30
40	0	1	30	1	30	1	30	1	30	1	30	1	29	+1.33	−1.31
40	10	1	31	1	30	1	30	1	30	1	30	1	30	1.34	1.31
40	20	1	31	1	31	1	30	1	30	1	30	1	30	1.35	1.31
40	30	1	31	1	31	1	31	1	30	1	30	1	30	1.36	1.32
40	40	1	31	1	31	1	31	1	31	1	30	1	30	1.37	1.32
40	50	1	32	1	31	1	31	1	31	1	31	1	30	+1.38	−1.32
41	0	1	32	1	32	1	31	1	31	1	31	1	31	1.39	1.33
41	10	1	32	1	32	1	32	1	31	1	31	1	31	1.40	1.33
41	20	1	32	1	32	1	32	1	32	1	31	1	31	1.42	1.33
41	30	1	33	1	32	1	32	1	32	1	32	1	31	1.43	1.34
41	40	1	33	1	33	1	32	1	32	1	32	1	32	+1.44	−1.34
41	50	1	33	1	33	1	33	1	32	1	32	1	32	1.45	1.34
42	0	1	33	1	33	1	33	1	33	1	32	1	32	1.47	1.35
42	10	1	33	1	33	1	33	1	33	1	33	1	32	1.48	1.35
42	20	1	34	1	34	1	33	1	33	1	33	1	33	1.50	1.35
42	30	1	34	1	34	1	34	1	33	1	33	1	33	+1.51	−1.36
42	40	1	34	1	34	1	34	1	34	1	33	1	33	1.52	1.36
42	50	1	35	1	34	1	34	1	34	1	34	1	33	1.54	1.36
43	0	1	35	1	35	1	34	1	34	1	34	1	34	1.55	1.37
43	10	1	35	1	35	1	35	1	34	1	34	1	34	1.56	1.37
43	20	1	35	1	35	1	35	1	35	1	34	1	34	+1.57	−1.38
43	30	1	36	1	35	1	35	1	35	1	35	1	34	1.58	1.38
43	40	1	36	1	36	1	35	1	35	1	35	1	35	1.60	1.38
43	50	1	36	1	36	1	36	1	35	1	35	1	35	1.61	1.39
44	0	1	36	1	36	1	36	1	36	1	35	1	35	1.62	1.39
44	10	1	37	1	36	1	36	1	36	1	36	1	35	+1.63	−1.40
44	20	1	37	1	37	1	36	1	36	1	36	1	36	1.65	1.40
44	30	1	37	1	37	1	37	1	36	1	36	1	36	1.66	1.40
44	40	1	37	1	37	1	37	1	37	1	37	1	36	1.68	1.41
44	50	1	38	1	38	1	37	1	37	1	37	1	37	1.70	1.41
45	0	1	38	1	38	1	38	1	37	1	37	1	37	+1.72	−1.42
45	10	1	38	1	38	1	38	1	38	1	37	1	37	1.73	1.42
45	20	1	39	1	38	1	38	1	38	1	38	1	37	1.75	1.42
45	30	1	39	1	39	1	38	1	38	1	38	1	38	1.76	1.43
45	40	1	39	1	39	1	39	1	38	1	38	1	38	1.78	1.43
45	50	1	39	1	39	1	39	1	39	1	39	1	38	+1.80	−1.44
46	0	1	40	1	40	1	39	1	39	1	39	1	39	1.82	1.44
46	10	1	40	1	40	1	40	1	39	1	39	1	39	1.83	1.44
46	20	1	40	1	40	1	40	1	40	1	39	1	39	1.85	1.45
46	30	1	41	1	40	1	40	1	40	1	40	1	40	1.87	1.45
46	40	1	41	1	41	1	41	1	40	1	40	1	40	+1.88	−1.46
46	50	1	41	1	41	1	41	1	41	1	40	1	40	1.90	1.46
47	0	1	42	1	41	1	41	1	41	1	41	1	40	1.91	1.47
47	10	1	42	1	42	1	41	1	41	1	41	1	41	1.93	1.47
47	20	1	42	1	42	1	42	1	42	1	41	1	41	1.95	1.48
47	30	1	43	1	42	1	42	1	42	1	42	1	41	+1.96	−1.48

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Decl.		88° 50' 20''			88° 50' 30''			88° 50' 40''			88° 50' 50''			88° 51' 0''			88° 51' 10''			Variation for—	
Lat.																				1' of Lat.	1'' of δ.
°	'	°	'	''	°	'	''	°	'	''	°	'	''	°	'	''	°	'	''	''	''
47	30	1	43	7.7	1	42	52.9	1	42	38.1	1	42	23.3	1	42	8.5	1	41	53.7	+1.96	-1.48
47	40	1	43	27.4	1	43	12.5	1	42	57.7	1	42	42.9	1	42	28.0	1	42	13.2	1.98	1.49
47	50	1	43	47.3	1	43	32.4	1	43	17.5	1	43	2.6	1	42	47.7	1	42	32.8	2.00	1.49
48	0	1	44	7.4	1	43	52.5	1	43	37.5	1	43	22.6	1	43	7.6	1	42	52.7	2.02	1.50
48	10	1	44	27.7	1	44	12.7	1	43	57.7	1	43	42.7	1	43	27.7	1	43	12.7	2.04	1.50
48	20	1	44	48.2	1	44	33.1	1	44	18.1	1	44	3.0	1	43	48.0	1	43	33.0	+2.06	-1.51
48	30	1	45	8.9	1	44	53.8	1	44	38.7	1	44	23.6	1	44	8.5	1	43	53.4	2.07	1.51
48	40	1	45	29.7	1	45	14.6	1	44	59.5	1	44	44.4	1	44	29.2	1	44	14.0	2.09	1.52
48	50	1	45	50.7	1	45	35.6	1	45	20.4	1	45	5.3	1	44	50.0	1	44	34.7	2.11	1.52
49	0	1	46	11.9	1	45	56.7	1	45	41.5	1	45	26.3	1	45	11.0	1	44	55.7	2.13	1.53
49	10	1	46	33.3	1	46	18.1	1	46	2.8	1	45	47.5	1	45	32.2	1	45	16.9	+2.15	-1.53
49	20	1	46	55.0	1	46	39.6	1	46	24.3	1	46	9.0	1	45	53.6	1	45	38.3	2.17	1.54
49	30	1	47	16.9	1	47	1.4	1	46	46.0	1	46	30.6	1	46	15.2	1	45	59.8	2.19	1.54
49	40	1	47	38.9	1	47	23.4	1	47	7.9	1	46	52.4	1	46	37.0	1	46	21.6	2.21	1.55
49	50	1	48	1.1	1	47	45.6	1	47	30.0	1	47	14.5	1	46	59.0	1	46	43.6	2.23	1.55
50	0	1	48	23.6	1	48	8.0	1	47	52.4	1	47	36.8	1	47	21.3	1	47	5.8	+2.25	-1.56
50	10	1	48	46.2	1	48	30.6	1	48	14.9	1	47	59.3	1	47	43.7	1	47	28.1	2.27	1.56
50	20	1	49	9.1	1	48	53.4	1	48	37.7	1	48	22.0	1	48	6.3	1	47	50.7	2.30	1.57
50	30	1	49	32.2	1	49	16.4	1	49	0.7	1	48	45.0	1	48	29.2	1	48	13.5	2.32	1.57
50	40	1	49	55.5	1	49	39.7	1	49	23.9	1	49	8.1	1	48	52.3	1	48	36.6	2.34	1.58
50	50	1	50	19.0	1	50	3.2	1	49	47.3	1	49	31.5	1	49	15.6	1	48	59.8	+2.36	-1.58
51	0	1	50	42.8	1	50	26.9	1	50	10.9	1	49	55.0	1	49	39.1	1	49	23.3	2.38	1.59
51	10	1	51	6.8	1	50	50.8	1	50	34.8	1	50	18.8	1	50	2.9	1	49	47.0	2.40	1.60
51	20	1	51	31.0	1	51	15.0	1	50	58.9	1	50	42.9	1	50	26.9	1	50	10.9	2.42	1.60
51	30	1	51	55.4	1	51	39.4	1	51	23.2	1	51	7.2	1	50	51.1	1	50	35.1	2.45	1.61
51	40	1	52	20.1	1	52	4.0	1	51	47.8	1	51	31.7	1	51	15.6	1	50	59.5	+2.47	-1.61
51	50	1	52	45.0	1	52	28.8	1	52	12.6	1	51	56.5	1	51	40.3	1	51	24.1	2.50	1.62
52	0	1	53	10.2	1	52	53.9	1	52	37.7	1	52	21.5	1	52	5.2	1	51	49.0	2.52	1.62
52	10	1	53	35.6	1	53	19.3	1	53	3.0	1	52	46.7	1	52	30.4	1	52	14.1	2.54	1.63
52	20	1	54	1.2	1	53	44.9	1	53	28.5	1	53	12.1	1	52	55.7	1	52	39.4	2.57	1.64
52	30	1	54	27.2	1	54	10.8	1	53	54.3	1	53	37.9	1	53	21.5	1	53	5.0	+2.60	-1.64
52	40	1	54	53.4	1	54	36.9	1	54	20.4	1	54	3.9	1	53	47.4	1	53	30.9	2.62	1.65
52	50	1	55	19.9	1	55	3.3	1	54	46.7	1	54	30.1	1	54	13.5	1	53	57.0	2.65	1.66
53	0	1	55	46.6	1	55	30.0	1	55	13.3	1	54	56.6	1	54	40.0	1	54	23.4	2.67	1.66
53	10	1	56	13.5	1	55	56.9	1	55	40.1	1	55	23.4	1	55	6.7	1	54	50.0	2.70	1.67
53	20	1	56	40.7	1	56	24.0	1	56	7.2	1	55	50.4	1	55	33.6	1	55	16.9	+2.73	-1.68
53	30	1	57	8.2	1	56	51.4	1	56	34.6	1	56	17.7	1	56	0.9	1	55	44.1	2.75	1.68
53	40	1	57	36.0	1	57	19.1	1	57	2.2	1	56	45.3	1	56	28.4	1	56	11.5	2.78	1.69
53	50	1	58	4.0	1	57	47.0	1	57	30.1	1	57	13.1	1	56	56.2	1	56	39.3	2.81	1.70
54	0	1	58	32.3	1	58	15.2	1	57	58.3	1	57	41.3	1	57	24.3	1	57	7.3	2.84	1.70
54	10	1	59	0.9	1	58	43.8	1	58	26.8	1	58	9.7	1	57	52.6	1	57	35.5	+2.87	-1.71
54	20	1	59	29.9	1	59	12.7	1	58	55.6	1	58	38.4	1	58	21.2	1	58	4.1	2.90	1.72
54	30	1	59	59.1	1	59	41.9	1	59	24.7	1	59	7.5	1	58	50.2	1	58	33.0	2.93	1.72
54	40	2	0	28.6	2	0	11.4	1	59	54.1	1	59	36.8	1	59	19.5	1	59	2.2	2.96	1.73
54	50	2	0	58.5	2	0	41.1	2	0	23.8	2	0	6.4	1	59	49.0	1	59	31.6	3.00	1.74
55	0	2	1	28.6	2	1	11.2	2	0	53.8	2	0	36.4	2	0	18.9	2	0	1.4	+3.03	-1.74
55	10	2	1	59.1	2	1	41.6	2	1	24.1	2	1	6.6	2	0	49.0	2	0	31.5	3.06	1.75
55	20	2	2	29.8	2	2	12.3	2	1	54.7	2	1	37.1	2	1	19.5	2	1	1.9	3.09	1.76
55	30	2	3	0.9	2	2	43.3	2	2	25.6	2	2	8.0	2	1	50.3	2	1	32.6	3.12	1.76
55	40	2	3	32.3	2	3	14.6	2	2	56.9	2	2	39.2	2	2	21.5	2	2	3.7	3.15	1.77
55	50	2	4	4.1	2	3	46.3	2	3	28.5	2	3	10.7	2	2	52.8	2	2	35.0	+3.18	-1.78
56	0	2	4	36.2	2	4	18.3	2	4	0.4	2	3	42.5	2	3	24.6	2	3	6.7	3.22	1.79
56	10	2	5	8.6	2	4	50.6	2	4	32.7	2	4	14.7	2	3	56.7	2	3	38.8	3.25	1.80
56	20	2	5	41.4	2	5	23.3	2	5	5.3	2	4	47.3	2	4	29.2	2	4	11.2	3.28	1.80
56	30	2	6	14.5	2	5	56.4	2	5	38.3	2	5	20.2	2	5	2.0	2	4	43.9	3.32	1.81
56	40	2	6	48.0	2	6	29.8	2	6	11.6	2	5	53.4	2	5	35.2	2	5	17.0	+3.35	-1.82
56	50	2	7	21.9	2	7	3.6	2	6	45.3	2	6	27.0	2	6	8.7	2	5	50.4	3.39	1.83
57	0	2	7	56.1	2	7	37.7	2	7	19.3	2	7	1.0	2	6	42.6	2	6	24.2	3.43	1.83
57	10	2	8	30.7	2	8	12.2	2	7	53.7	2	7	35.3	2	7	16.8	2	6	58.4	3.46	1.84
57	20	2	9	5.7	2	8	47.1	2	8	28.5	2	8	10.0	2	7	51.5	2	7	32.9	3.50	1.85
57	30	2	9	41.1	2	9	22.4	2	9	3.7	2	8	45.1	2	8	26.4	2	8	7.8	+3.53	-1.86

AZIMUTH OF POLARIS AT ELONGATION, 1913.

Decl. Lat.	88° 50' 20''			88° 50' 30''			88° 50' 40''			88° 50' 50''			88° 51' 0''			88° 51' 10''			Variation for—	
																			1' of Lat.	1'' of δ.
° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	"	"
57 30	2 9 41.1	2 9 22.4	2 9 3.7	2 8 45.1	2 8 26.4	2 8 7.8	+3.53	-1.86												
57 40	2 10 16.8	2 9 58.0	2 9 39.3	2 9 20.6	2 9 1.9	2 8 43.2	3.57	1.87												
57 50	2 10 52.9	2 10 34.1	2 10 15.3	2 9 56.5	2 9 37.7	2 9 18.9	3.61	1.88												
58 0	2 11 29.4	2 11 10.5	2 10 51.6	2 10 32.7	2 10 13.8	2 9 55.0	3.65	1.89												
58 10	2 12 6.4	2 11 47.4	2 11 28.4	2 11 9.4	2 10 50.4	2 10 31.5	3.70	1.90												
58 20	2 12 43.8	2 12 24.7	2 12 5.6	2 11 46.5	2 11 27.4	2 11 8.4	+3.75	-1.91												
58 30	2 13 21.5	2 13 2.4	2 12 43.2	2 12 24.0	2 12 4.8	2 11 45.7	3.80	1.92												
58 40	2 13 59.7	2 13 40.5	2 13 21.2	2 13 2.0	2 12 42.7	2 12 23.5	3.84	1.93												
58 50	2 14 38.4	2 14 19.0	2 13 59.7	2 13 40.4	2 13 21.0	2 13 1.7	3.89	1.94												
59 0	2 15 17.5	2 14 58.0	2 14 38.6	2 14 19.2	2 13 59.7	2 13 40.3	3.93	1.95												
59 10	2 15 57.0	2 15 37.4	2 15 17.9	2 14 58.4	2 14 38.9	2 14 19.4	+3.98	-1.96												
59 20	2 16 37.0	2 16 17.3	2 15 57.7	2 15 38.1	2 15 18.5	2 14 58.9	4.02	1.97												
59 30	2 17 17.5	2 16 57.7	2 16 38.0	2 16 18.3	2 15 58.6	2 15 38.9	4.07	1.98												
59 40	2 17 58.4	2 17 38.6	2 17 18.7	2 16 58.9	2 16 39.1	2 16 19.3	4.11	1.99												
59 50	2 18 39.8	2 18 19.9	2 18 0.0	2 17 40.1	2 17 20.2	2 17 0.2	4.16	2.00												
60 0	2 19 21.7	2 19 1.7	2 18 41.7	2 18 21.7	2 18 1.7	2 17 41.7	+4.20	-2.01												

TABLE Va.

FOR REDUCING TO ELONGATION, OBSERVATIONS MADE NEAR ELONGATION, 1913.

Azimuth at Elong. *Time.									Azimuth at Elong. Time.*
	1° 10'	1° 20'	1° 30'	1° 40'	1° 50'	2° 0'	2° 10'	2° 20'	
m	"	"	"	"	"	"	"	"	m
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.1	+ 0.2	1
2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	2
3	0.4	0.4	0.4	0.5	0.6	0.6	0.7	0.7	3
4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	4
5	+ 1.0	+ 1.1	+ 1.3	+ 1.4	+ 1.6	+ 1.7	+ 1.9	+ 2.0	5
6	1.4	1.6	1.8	2.1	2.3	2.5	2.7	2.9	6
7	2.0	2.2	2.5	2.8	3.1	3.4	3.7	3.9	7
8	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.1	8
9	3.3	3.7	4.2	4.7	5.1	5.5	6.0	6.5	9
10	+ 4.0	+ 4.6	+ 5.1	+ 5.7	+ 6.3	+ 6.8	+ 7.4	+ 8.0	10
11	4.9	5.6	6.2	6.9	7.6	8.3	9.0	9.7	11
12	5.8	6.6	7.4	8.2	9.0	9.9	10.7	11.5	12
13	6.8	7.8	8.7	9.7	10.6	11.6	12.5	13.5	13
14	7.8	9.0	10.1	11.2	12.3	13.4	14.5	15.7	14
15	+ 9.0	+10.3	+11.6	+12.9	+14.1	+15.4	+16.7	+18.0	15
16	10.2	11.7	13.2	14.6	16.1	17.5	19.0	20.4	16
17	11.5	13.2	14.9	16.4	18.2	19.8	21.4	23.0	17
18	12.9	14.8	16.7	18.5	20.4	22.2	24.0	25.9	18
19	14.4	16.5	18.6	20.7	22.7	24.7	26.8	28.9	19
20	+16.0	+18.3	+20.6	+22.9	+25.1	+27.4	+29.7	+32.0	20
21	17.7	20.2	22.7	25.2	27.7	30.2	32.7	35.3	21
22	19.4	22.1	24.9	27.6	30.4	33.2	35.9	38.7	22
23	21.2	24.2	27.2	30.2	33.2	36.3	39.2	42.3	23
24	23.0	26.3	29.6	32.9	36.2	39.4	42.7	46.0	24
25	+25.0	+28.6	+32.1	+35.7	+39.3	+42.7	+46.3	+49.9	25
26	27.0	30.9	34.7	38.6	42.4	46.3	50.1	54.0	26
27	29.1	33.3	37.5	41.6	45.7	50.0	54.0	58.2	27
28	31.3	35.8	40.3	44.7	49.2	53.7	58.1	62.6	28
29	33.6	38.4	43.2	48.0	52.8	57.6	62.3	67.1	29
30	+35.9	+41.1	+46.2	+51.4	+56.5	+61.6	+66.7	+71.8	30

* Sidereal time from elongation.

FOR FINDING THE TIMES OF UPPER AND LOWER CULMINATION OF POLARIS FROM THE OBSERVED TIMES WHEN THE STAR IS ON THE SAME VERTICAL CIRCLE WITH THE STARS ζ URSÆ MAJORIS (MIZAR) *SUB POLO* AND δ CASSIOPEIÆ *SUB POLO*, RESPECTIVELY.

Except at high latitudes, the pole star at either upper or lower culmination furnishes a simple and convenient method for laying down a meridian line on the earth's surface at points in the northern hemisphere. When the local time is unknown and accurate astronomical instruments are not available, the time of culmination of Polaris may be found by observing the instant when Polaris is vertically above (has the same azimuth as) ζ Ursæ Majoris (Mizar) below the pole, or δ Cassiopeiæ below the pole. In the former case, for the year 1913, Polaris is approaching upper culmination and in the latter case it is approaching lower culmination. The mean time interval which elapses between the observed times above mentioned and upper or lower culmination, as the case may be, are given for ζ Ursæ Majoris and δ Cassiopeiæ for ten-day intervals in the following table. This method can not be used at places south of 30° north latitude.

TABLE VI.
MEAN TIME INTERVAL.

ζ URSÆ MAJORIS (MIZAR). (Upper culmination of Polaris.)							δ CASSIOPEIÆ. (Lower culmination of Polaris.)						
1913	Lat.	40°	45°	50°	55°	60°	1913	Lat.	35°	40°	45°	50°	55°
		m s	m s	m s	m s	m s			m s	m s	m s	m s	m s
Jan.	1	7 18	7 17	7 15	7 13	7 10	Jan.	1	8 22	8 23	8 25	8 27	8 29
	11	7 8	7 7	7 5	7 3	7 0		11	8 11	8 12	8 14	8 16	8 18
	21	6 58	6 57	6 55	6 53	6 50		21	8 1	8 2	8 4	8 6	8 8
July	10	7 13	7 11	7 9	7 7	7 4	Feb.	31	7 50	7 51	7 53	7 55	7 57
	20	7 24	7 22	7 20	7 18	7 15		10	7 40	7 41	7 42	7 44	7 46
	30	7 34	7 33	7 31	7 29	7 26		20	7 30	7 31	7 33	7 35	7 37
Aug.	9	7 44	7 43	7 41	7 38	7 35	Mar.	2	7 23	7 24	7 26	7 28	7 30
	19	7 53	7 52	7 50	7 47	7 44		12	7 16	7 17	7 19	7 21	7 23
	29	8 2	8 0	7 58	7 56	7 53		22	7 12	7 13	7 14	7 16	7 18
Sept.	8	8 10	8 8	8 6	8 3	8 0	Apr.	1	7 10	7 11	7 12	7 14	7 16
	18	8 15	8 14	8 12	8 9	8 6		11	7 10	7 11	7 12	7 14	7 16
	28	8 20	8 18	8 16	8 14	8 11		21	7 11	7 12	7 13	7 15	7 17
Oct.	8	8 24	8 22	8 20	8 17	8 14	May	1	7 14	7 15	7 17	7 19	7 21
	18	8 25	8 24	8 22	8 19	8 16		11	7 20	7 21	7 23	7 24	7 26
	28	8 25	8 23	8 21	8 18	8 15		21	7 27	7 28	7 30	7 32	7 34
Nov.	7	8 24	8 22	8 20	8 17	8 14	June	31	7 35	7 36	7 38	7 39	7 41
	17	8 21	8 19	8 17	8 14	8 11		10	7 44	7 45	7 47	7 49	7 51
	27	8 15	8 14	8 12	8 9	8 6		20	7 55	7 56	7 58	8 0	8 2
Dec.	7	8 8	8 7	8 5	8 2	7 59	July	30	8 5	8 6	8 8	8 10	8 13
	17	8 0	7 59	7 57	7 54	7 51		10	8 16	8 17	8 19	8 21	8 23
	27	7 52	7 50	7 48	7 46	7 43		20	8 27	8 28	8 30	8 32	8 35
	37	7 42	7 41	7 39	7 37	7 34		30	8 38	8 40	8 42	8 44	8 46

[Eph 13]

ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

The matter contained in the first 175 pages of this volume is intended primarily for the use of navigators, and consists of ephemerides of the Sun and Moon and of the planets Mercury, Venus, Mars, Jupiter, and Saturn. The remainder of the book contains ephemerides of all the planets, of their satellites, of 825 fixed stars, elements for the computation of predictions of eclipses of the Sun and Moon and of occultations of stars, tables of the pole star, Polaris, and in addition miscellaneous data for the convenience and use of astronomers, surveyors, and the general public.

TIME.

There are in general use three different kinds of time, True Solar Time—also called Apparent Solar Time—Mean Solar Time, and Sidereal Time.

True or Apparent Solar Time is measured by the diurnal motion of the Sun, the length of the day being the interval between two successive transits of the Sun over the same meridian, and the time of day being the hour-angle of the Sun westward from the meridian. Owing to the obliquity of the ecliptic and to the lack of uniformity of the motion of the Earth in its orbit, the rate of motion of the Sun in hour-angle and the length of the apparent solar day are not constant. Therefore clocks and chronometers can not be regulated to apparent solar time, which may, however, be determined by observations of the Sun when visible.

Mean Solar Time is measured by the motion of a fictitious body called the mean Sun which is supposed to move uniformly in the celestial equator, completing the circuit in one tropical year. Since mean solar time is uniform and regular in its passage, clocks and watches may be regulated to it, and those in ordinary use are usually so regulated.

Mean solar time can not, of course, be determined by direct observation, but may be determined indirectly by correcting observations of the Sun for the equation of time (page 702), or by converting to mean time sidereal time determined by observations of fixed stars (page 701).

The Mean Solar Day is the unit of mean solar time, and is equal in length to the mean or average of all the true or apparent solar days of the year. It may be otherwise defined as the interval of time elapsing between two successive transits of the mean Sun across the meridian of any place.

Sidereal Time or star time, in general terms, is measured by the diurnal motion of the fixed stars, or, speaking more precisely, by the diurnal motion of that point on the celestial equator called the vernal equinox, from which the right ascensions of the heavenly bodies are measured. Astronomical clocks regulated to sidereal time are called sidereal clocks. Sidereal time may be determined from observations of stars whose right ascensions are known.

A *Sidereal Day* is very nearly the length of time in which the Earth rotates on its axis and is accurately defined as the time interval between two successive transits of the vernal equinox over the same meridian. The sidereal day is shorter than the mean solar day by $3^{\text{m}} 56^{\text{s}}.555$ sidereal time or $3^{\text{m}} 55^{\text{s}}.909$ mean solar time, the tropical year of 365.2422 mean solar days containing 366.2422 sidereal days. Sidereal time and the length of the sidereal day are subject to slight irregularities on account of small differences between the positions of the true and mean equinoxes.

The mean solar and sidereal days are each divided into 24 hours. About March 23 (civil date) of each year, about two days after the vernal equinox, there is an instant when the face of a sidereal clock shows the same time as a mean time clock, and the former gains on the latter $3^{\text{m}} 56^{\text{s}}.555$ sidereal time per mean solar day, so that at the end of a year it will have gained one sidereal day and will again agree with the mean time clock.

The Equation of Time is the difference in hour-angle between the true Sun and the mean Sun. The true Sun is sometimes before and sometimes behind the mean Sun by an amount which varies from zero to about 16 minutes. The equation of time is given on pages I and II of each month of the Greenwich Ephemeris, and in the Solar Ephemeris for the Meridian of Washington, pages 518–525.

The Civil Day begins at midnight and comprises 24 hours, the hours being counted from 0 to 12 in two series; the first, marked A. M., running from midnight to noon, and the second, marked P. M., running from noon to midnight.

The Astronomical Day begins at noon on the civil day of the same date, the 24 hours being counted from 0 to 24, running from noon of one day to noon of the next following day. Astronomical time as well as civil time may be either apparent or mean.

The civil day begins twelve hours before the astronomical day; therefore the first half of the civil day corresponds to the last half of the preceding astronomical day, and the last half of the civil day coincides with the first half of the astronomical day of the same date. Thus, January 9, 2 o'clock, A. M., civil time, is January 8, 14^{h} , astronomical time; and January 9, 2 o'clock, P. M., civil time, is January 9, 2^{h} , astronomical time.

PRECEPTS FOR THE CONVERSION OF TIME.

To convert Sidereal Time at any place into Mean Solar Time, subtract the sidereal time of local mean noon for the beginning of the astronomical day, from the given sidereal time, and convert the interval of sidereal time thus found into mean time by means of Table II, page 686.

To convert Mean Solar Time at any place into Sidereal Time, convert the given interval of mean time (counted from mean noon) into sidereal time by means of Table III, page 689, and add the sidereal time of local mean noon for the beginning of the astronomical day.

Processes similar to the above may be employed, using the mean time of sidereal noon given on page III of the Greenwich Ephemeris instead of the sidereal time of mean noon.

To convert Apparent Solar Time into Mean Solar Time, add or subtract the equation of time as indicated on page I of the Greenwich Ephemeris, or add algebraically the equation of time taken from the Washington Solar Ephemeris, pages 518–525.

To convert Mean Solar Time into Apparent Solar Time, add or subtract the equation of time as indicated on page II of the Greenwich Ephemeris, or subtract algebraically the equation of time taken from the Washington Solar Ephemeris, pages 518–525.

To convert Civil Time into Astronomical Time.—If the civil time is marked A. M., take one from the day and add twelve to the hours; if the civil time is marked P. M., take away the designation P. M.

To convert Astronomical Time into Civil Time.—If the astronomical time is less than twelve hours, write P. M. after it; if greater than twelve hours, subtract twelve hours from it, mark the result A. M., and add one to the days. For example, October 3, 23 hours, astronomical time, is October 4, 11 o'clock, A. M., civil time.

To convert Mean Solar or Sidereal Time of any meridian B to that of another meridian A, add the difference of longitude expressed in time when A is east of B, and subtract the difference of longitude when A is west of B.

PART I.—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

Pages 2–145 give data arranged under the heads of the several months, and are therefore designated as the Calendar. Each month covers 12 pages, numbered from I to XII, whose contents are as follows:

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension* and *Declination*, and the *Equation of Time*. Adjoining columns contain the differences of these quantities for one hour. By multiplying any one of these differences by the hours and parts of an hour from Greenwich apparent noon, and adding the product to, or subtracting it from, the corresponding quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of the quantity in question for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, but when great accuracy is required they should be interpolated for half the hours and parts of an hour of the Greenwich apparent time.

The *Equation of Time* given on page I is the mean time of apparent noon, or the hour-angle of the mean Sun at that instant. The heading of the column directs how the equation is to be applied to apparent time, or the time given by an observation of the Sun, in order to get mean time. When in the course of the month there is a change from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change occurs.

The Sun's Semidiameter and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The semidiameter is used in reducing the altitude of the upper or lower limb of the Sun to the altitude of the center; and in reducing the angular distance between the limb of the Sun and any other object, to the distance from the center of the Sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the Sun's center over the wires of a transit

instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

This page is chiefly used when the Sun is observed on the meridian, at which instant the local apparent time is $0^h\ 0^m\ 0^s$. The longitude from Greenwich expressed in time is then the corresponding Greenwich apparent time before or after noon according as the longitude is east or west. The longitude of any place is therefore the factor employed in reducing the quantities on this page to apparent noon at that place.

The right ascension of the Sun thus reduced is the sidereal time of local apparent noon, and the difference between that and the clock time of the meridian passage of the Sun is the error of the clock on sidereal time.

The declination of the Sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the Sun.

As an example of the use of page I:—

Let the Sun's declination be required at apparent noon, 1913, April 15, at a place whose longitude is $89^\circ\ 40'$, or $5^h\ 58^m\ 40^s$ west from Greenwich:—

Local apparent time	April 15,	^h 0	^m 0	^s 0
Longitude from Greenwich (additive)		5	58	40
Greenwich apparent time	April 15,	5	58	40

Reducing the minutes and seconds to decimals of an hour, we find that this moment is $5^h.978$ after Greenwich apparent noon on April 15, or $18^h.022$ before Greenwich apparent noon on April 16.

On page 38 of the Ephemeris we find that the change of declination in one hour is:

April 15, at Greenwich apparent noon	+53. 71
April 16, at Greenwich apparent noon	+53. 30
Difference for one day	— 0. 41

If great exactness is desired, we find the amount of this hourly difference for the time which is halfway between Greenwich noon and the time of observation; that is, for 3 hours after Greenwich noon of the 15th, this being half of 6 hours. Three hours is 0.125 of a day; so the calculation is as follows:

Difference for one hour, April 15	+53. 71
Change for 0.125 of a day or $-0''.41 \times 0.125$	— 0. 05
Difference at 3 hours after noon	+53. 66
$53''.66 \times 5.978 = 320''.8 = 5'\ 20''.8$	
Declination at Greenwich noon, April 15	N. 9 39 3. 7
Change in 5.978 hours (additive)	5 20. 8
Sun's declination at time of observation	N. 9 44 24. 5

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given the time is $18^h.022$ before Greenwich noon of April 16; half this interval is about 0.375 of a day, and the hourly motion for the middle of the

interval is $53''.45$. Then, we find—

		°	'	''
Declination at Greenwich noon, April 16	.	N.	10	0 27.9
Product of $53''.45 \times 18.022 = 963''.3$ (subtractive)	—		16	3.3
Sun's declination at time of observation	.	N.	9	44 24.6

It will always be well to make the calculation in both ways, as a check; but if the results differ slightly, the one derived from the nearest noon should be regarded as the more accurate. At sea, however, it is ordinarily sufficient to compute the declination to the nearest half minute, and the reduction may then be found by Table 12 of BOWDITCH'S *American Practical Navigator*.

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension and Declination*, the *Equation of Time*, and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given, and may be used in reducing them for the longitude, or to any Greenwich mean time. When great precision is required, these changes should be interpolated for half the Greenwich time, as described in explaining the calculation of the declination.

The *Equation of Time* given on page II is the apparent time of mean noon, and is equivalent to the hour-angle of the true Sun at the instant of mean noon. The heading of the column directs how the equation must be applied to mean time in order to obtain apparent time.

The *Sidereal Time of Mean Noon* is the right ascension of the mean Sun at Greenwich mean noon. It may be reduced for the longitude, or to any Greenwich mean time, by using the hourly difference, $9^s.8565$; or by Table III, page 689 of this volume, for reducing intervals of mean solar to sidereal time; or by Table 9 of BOWDITCH'S *Navigator*.

The right ascensions and declinations on pages I and II are affected both by aberration and nutation, and therefore denote the *apparent* positions of the *true* Sun. Page I is used for observations which depend upon apparent time, as when the Sun is observed on the meridian; while page II is used when the times have been noted by a clock or chronometer regulated to mean time, as is the case in most observations of the Sun out of the meridian.

The Sun's declination is required whenever that body is observed for the purpose of finding latitude, local time, or azimuth, and the equation of time is needed in finding the apparent time when determining the latitude from observations of the Sun out of the meridian.

The sidereal time of mean noon, or right ascension of the mean Sun, is useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the right ascension of the mean Sun for that time, and this being added to the local astronomical mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time gives the interval of sidereal time from noon, and that is converted into the required mean time by subtracting from it the corresponding reduction of a sidereal interval to a mean-time interval, taken from Table II, page 686 of this volume, or from Table 8 of BOWDITCH'S *Navigator*. Instead of

using Table II, this reduction may be found by multiplying 9^s.8296 by the hours and parts of an hour of the sidereal interval from noon.

As examples of the use of page II:—

1.—Let the Sun's right ascension and the equation of time be required for 1913, July 13, 10^h 3^m 30^s, A. M., mean time, at a place whose longitude is 85° 15', or 5^h 41^m 0^s west of Greenwich.

Local astronomical mean time	July 12,	<div><div>h</div><div>m</div><div>s</div></div> <div>22 3 30</div>
Longitude from Greenwich (additive)		<div><div>5 41 0</div></div>
Greenwich mean time	July 13,	<div><div>3 44 30=3^h.7417</div></div>

Sun's Right Ascension.

Equation of Time.

July 13, Greenwich noon	<div><div>h</div><div>m</div><div>s</div></div> <div>7 28 30.70</div>	July 13, Greenwich noon	<div><div>m</div><div>s</div></div> <div>5 28.18 (subtractive)</div>
H. D. 10 ^s .159×3.7417	<div><div>+</div><div>38.01</div></div>	H. D. +0 ^s .302×3.7417	<div><div>+</div><div>1.13</div></div>
	<div><div>7 29 8.71</div></div>		<div><div>5 29.31</div></div>

In this case the hourly differences interpolated to half the interval, or 1^h.87 after noon, have been used. The equation of time is here subtractive from mean time. Its reduction could have been found by Table 12 of BOWDITCH'S *Navigators*.

2.—If the sidereal time is required for the same time and place, we have—

July 13, sidereal time (at Greenwich mean noon)	<div><div>h</div><div>m</div><div>s</div></div> <div>7 23 2.52</div>
Reduction for 3 ^h 44 ^m 30 ^s from Table III, or 9 ^s .8565×3.7417	<div><div>+</div><div>36.88</div></div>
Add the local astronomical mean time	<div><div>22 3 30.00</div></div>
The required sidereal time is (rejecting 24 ^h)	<div><div>5 27 9.40</div></div>

3.—On 1913, July 13, A. M., at a place whose longitude is 85° 15' W., suppose the sidereal time to be 5^h 27^m 9^s.40, and that the corresponding mean time is required.

The astronomical day is July 12; the longitude in time, +5^h 41^m 0^s, or +5^h.683.

July 12, sidereal time (at Greenwich mean noon)	<div><div>h</div><div>m</div><div>s</div></div> <div>7 19 5.96</div>
Reduction for 5 ^h 41 ^m 0 ^s from Table III, or 9 ^s .8565×5.683	<div><div>+</div><div>56.01</div></div>
The sidereal time of local mean noon	<div><div>7 20 1.97</div></div>
The given sidereal time (+24 ^h , if necessary for the following subtraction)	<div><div>29 27 9.40</div></div>
Subtracting the first from the second gives the sidereal interval from noon	<div><div>22 7 7.43=22^h.1187</div></div>
Reduction for 22 ^h 7 ^m 7 ^s .43 from Table II, or −9 ^s .8296×22.1187	<div><div>− 3 37.42</div></div>

The required astronomical mean time is . July 12, 22 3 30.01

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude* and *Latitude*, and the *Logarithm of the Radius Vector of the Earth*. The longitudes of the Sun are the true geometric longitudes, not corrected for aberration. They are given in two columns, headed, respectively, λ and λ'; λ representing the Sun's longitude counted from the true equinox of the date; and λ', the same coordinate counted from the mean equinox of the beginning of the Besselian fictitious year. The latitude is referred to the mean ecliptic of the date. Columns of hourly differences are given to facilitate finding the Sun's longitude, or the logarithm of the radius vector, for any hour from noon.

This column may be used in converting sidereal time to mean time instead of that on page II. As an illustration, let us take Example 3, above.

July 12, the mean time of Greenwich sidereal noon is	. . . . .	16 ^h 38 ^m 10.06 ^s
Reduction for longitude from Table II, or $-9^s.8296 \times 5.683$	. . . . .	-55.86
		<hr/>
The mean time of local sidereal noon	. . . . .	16 37 14.20
Add the given sidereal time	. . . . .	5 27 9.40 = 5 ^h .4526
		<hr/>
The sum is	. . . . .	22 4 23.60
Reduction for 5 ^h 27 ^m 9 ^s .40 from Table II, or $-9^s.8296 \times 5.4526$	. . . . .	-53.60
		<hr/>
The required astronomical mean time	. . . . . July 12,	22 3 30.00

The reduction of the Moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.2725 (see p. xi), or by simply computing the proportional part.

$$12^h : 7^h = 3''.0 : 1''.7$$

The Moon's semidiameter and horizontal parallax are required for all observations of the Moon. When great precision is needed, the hourly differences should be interpolated for half the interval of Greenwich time from noon or midnight, and the horizontal parallax should be corrected for the latitude of the place of observation.

The mean time of *The Moon's Upper Transit* at Greenwich and the *Age of the Moon* are also contained on page IV. The time of transit is given to tenths of a minute, and is accompanied by a column of differences for one hour of longitude, by means of which the local time of the Moon's meridian transit may be computed

for any other place whose longitude is known. Table 11 of BOWDITCH'S *Navigator* furnishes the necessary reduction by simple inspection. The age of the Moon, or the time elapsed since the preceding new Moon, is given to tenths of a day.

Pages V–XII contain *The Moon's Right Ascension and Declination* for each day and hour of Greenwich mean time. They are accompanied by columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may either be taken from a well-regulated chronometer, or may be obtained by applying the longitude, converted into time, to the local mean time of the observer. The right ascension or declination is taken out for the given day and hour of Greenwich mean time; the *Diff. for 1 Minute* is multiplied by the minutes and parts of a minute of the Greenwich time, and the product is added to or subtracted from the quantity, according as the latter is increasing or decreasing.

Thus, suppose the Moon's right ascension and declination are required for 1913, April 27, 10^h 10^m 30^s, astronomical mean time at Greenwich:—

<i>Right Ascension.</i>				<i>Declination.</i>			
	<i>h</i>	<i>m</i>	<i>s</i>		<i>°</i>	<i>'</i>	<i>"</i>
April 27, 10 ^h	20	26	45.44	S.	23	48	9.3
Diff. 2 ^s .1059 × 10.5			22.11	+8 ["] .548 × 10.5	+	1	29.8
April 27, 10 ^h 10 ^m 30 ^s	20	27	7.55	S.	23	46	39.5

For the sake of precision, the differences here employed have been interpolated for 5^m.2 = 0^h.09.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the Earth.

Pages 146–177 contain the geocentric ephemerides of the seven major planets. The places given are apparent positions; that is, they are referred to the equator and true equinox of the date, and are corrected for aberration. All the data except meridian passage are given for the instant of Greenwich mean noon. The column *Meridian Passage* shows the hour, minute, and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it is observed for time, latitude, or azimuth. The mode of reducing the ephemeris positions of planets to other instants of Greenwich mean time is the same as that given for the Sun on pages 704–707. The local mean time of meridian passage of any planet, at any place, can be found by dividing the proper daily difference of the ephemeris times by 24, multiplying the quotient by the longitude of the place expressed in hours and fractions, and applying the product with its proper sign to the time of Greenwich passage.

Pages 178–199 contain the heliocentric coordinates of the seven major planets, and the logarithms of their distances from the Earth. The *Heliocentric Longitude* is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The *Daily Motion* is given for the instant of Greenwich mean noon. The column *Reduction to Orbit* contains the correction to be applied to the heliocentric longitude in order to obtain the longitude counted along the orbit of the planet. The latter is equal to the distance from the mean equinox to the node, plus the distance from the node to the planet. The *Heliocentric Latitude* is counted from the mean ecliptic of the date. The

Logarithm of Radius Vector is the logarithm of the distance of the center of the planet from that of the Sun, at the Greenwich mean noon whose date is given in the first column. The last two columns give, respectively, the logarithm of the true distance of the center of the planet from that of the Earth, for the Greenwich noon indicated on the left-hand side of the page, and for the time which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean midnight of the same day; in the case of Venus and Mars, it is the mean noon of the day immediately following; in the case of Jupiter and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 200–207 contain the rectangular coordinates of the center of the Sun, referred to the center of the Earth as the origin, and to the true equator and equinox of each date as the plane and point of reference. Each coordinate is given both for Greenwich mean noon and for Greenwich mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan. 0*, give the corrections to be applied to the coordinates for noon in order to obtain the corresponding coordinates referred to the mean equator and the mean equinox of the beginning of the Besselian fictitious year.

Pages 208–211 contain for every Greenwich mean noon and midnight the apparent geocentric longitude and latitude of the Moon referred to the true ecliptic and equinox of the date.

Page 212 contains the position of the *Moon's Equator*, the *Longitude of the Moon's Perigee*, the *Mean Longitude of the Moon's Ascending Node*, and the *Moon's Mean Longitude*.

Page 213 contains the elements of the *Moon's Libration*, and the *Sun's Aberration and Horizontal Parallax*. The formulæ for finding the libration in longitude and latitude, are given on page xii. *The Sun's Aberration* is the quantity which is to be applied to the true longitude of the Sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. *The Sun's Horizontal Parallax*, given in the last column, is the angle subtended by the equatorial radius of the Earth, as seen from the center of the Sun.

Pages 214, 231–232 contain data for precession and the obliquity of the ecliptic, together with all sensible terms arising from the motions of the equator and ecliptic. To show clearly the relations of these quantities, let

λ = the longitude of any body referred to the true equinox of the date.

λ' = the longitude of the same body referred to the mean equinox of the beginning of the Besselian fictitious year.

ψ_1 = the adopted value of the general precession.

$\delta'\psi$ = the principal term of the nutation in longitude; or, in other words, the correction to be applied to the longitude of a body referred to the mean equinox of date, in order to obtain that longitude as referred to the true equinox, exclusive of short period terms. When the correction is positive, the longitudes referred to the true equinox are greater than those referred to the mean equinox; while the contrary is the case when the correction has a negative sign.

$\delta''\psi$ = the short period terms of nutation in longitude, given on pages 231–232.

ω = the true or apparent obliquity of the ecliptic at the date.

ω' = the mean obliquity of the ecliptic at the beginning of the Besselian fictitious year.

$\delta'\omega$ = the principal term of the nutation of the obliquity of the ecliptic; or, in other words, the correction to be applied to the mean obliquity of date in order to find the true or apparent obliquity, exclusive of short period terms. This quantity is tabulated on page 214, and is positive or negative according as the true obliquity is greater or less than the mean obliquity.

$\delta''\omega$ = the short period terms of nutation in obliquity, given on pages 231–232.

τ = the fraction of a year intervening between the instant when the Sun's mean longitude was 280° and the date for which λ or ω is required.

Then—

$$\begin{aligned}\lambda &= \lambda' + \tau\psi_1 + \delta'\psi + \delta''\psi \\ \omega &= \omega' - 0''.464 \tau + \delta'\omega + \delta''\omega\end{aligned}$$

Page 214 contains, for each fifth Greenwich mean noon throughout the year, certain quantities which may be described in terms of the above notation as follows: The *Precession in Longitude from 1913.0* = $\tau\psi_1$; the *Nutation in Longitude* = $\delta'\psi$; the *Nutation in Right Ascension* = $(\delta'\psi) \cos \omega'$; the *Nutation in Obliquity* = $\delta'\omega$, and the *Obliquity of the Ecliptic* = $\omega - \delta''\omega$, which is the true inclination of the Earth's equator to the ecliptic, exclusive of the terms depending on the Moon's longitude.

PART II.—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Pages 216–217 contain formulæ for reducing the positions of fixed stars, including expressions for the Besselian star-numbers and star-constants, and for the independent star-numbers; the whole based upon the constants of the Paris Conference of May, 1896, and expressed in the notation of Bessel.

Pages 218–221 contain the logarithms of the *Besselian Star-Numbers*, A , B , C , D , for each Washington mean midnight, with the values of E appended at the bottoms of the pages. The terms of short period have been included. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given, and in ordinary cases four-figure logarithms suffice; but where extreme accuracy is desired the logarithms of A , C , and D are sometimes needed to five places of decimals. If used in accordance with the English and French notation, the pair of quantities A and B must be interchanged with the pair C and D ; that is, A must be interchanged with C , and B with D . Along with the solar day, the first column contains the sidereal hour of Washington mean midnight for certain dates, and by interpolation among them it is easy to find the sidereal time for which any set of quantities is given.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:

Computation of the apparent place of 36 Tauri for May 1, 1913, for the upper transit at Washington.

$\log a$	0.5543	$\log b$	8.1715	$\log c$	8.5645	$\log d$	8.7993
$\log A$	9.4804	$\log B$	0.9681 <i>n</i>	$\log C$	1.1530 <i>n</i>	$\log D$	1.1260 <i>n</i>
$\log a'$	1.0038	$\log b'$	9.9366 <i>n</i>	$\log c'$	8.6728	$\log d'$	9.3088
$\log Aa$	0.0347	$\log Bb$	9.1396 <i>n</i>	$\log Cc$	9.7175 <i>n</i>	$\log Dd$	9.9253 <i>n</i>
$\log Aa'$	0.4842	$\log Bb'$	0.9047	$\log Cc'$	9.8258 <i>n</i>	$\log Dd'$	0.4348 <i>n</i>

Mean Place, 1913.0.	$\alpha_0 =$	^h 3 ^m 59 ^s 9.307	$\delta_0 =$	[°] +23 ['] 52 ["] 1.59
	$Aa =$	+1.083	$Aa' =$	+3.05
	$Bb =$	-0.138	$Bb' =$	+8.03
	$Cc =$	-0.522	$Cc' =$	-0.67
	$Dd =$	-0.842	$Dd' =$	-2.72
	$E =$	0.000	$\tau \mu' =$	-0.01
	$\tau \mu =$	0.000		

Apparent Place, May 1,		^h 3 ^m 59 ^s 8.888	$\delta =$	[°] +23 ['] 52 ["] 9.27
	$-f' =$	-0.005		
	$\alpha =$	^h 3 ^m 59 ^s 8.883		

Pages 222-229 contain the *Independent Star-Numbers*, which can frequently be advantageously used instead of the *Besselian Star-Numbers*. The terms of short period have been included. These quantities are connected with those of Bessel by the relations given on page 216, which also contains the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, *a*, *b*, *c*, *d*, *a'*, *b'*, *c'*, *d'*, while the independent star-numbers render it possible to determine the apparent place of a star without computing these star-constants. Four-figure logarithms usually suffice, but where extreme accuracy is desired the logarithms of *g* and *h* are needed to five places of decimals, and *G* and *H* are needed to one-tenth of a minute of arc. The column τ gives the fraction of a year, counted from the beginning of the Besselian fictitious year to each date.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:

Computation of the apparent place of 36 Tauri for May 1, 1913, for the upper transit at Washington.

^h ^m $G = 20$ 12.4		[°] ['] $\delta_0 = +$ 23 52.0	
$\alpha_0 = 3$ 59.2		$G + \alpha_0 =$ 0 ^h 11 ^m .6	
$H = 15$ 7.1		$H + \alpha_0 =$ 19 6.3	
$\log \frac{1}{r}$	8.8239	$\log \frac{1}{r}$	8.8239
$\log g$	1.0451	$\log h$	1.2904
$\sin (G + \alpha_0)$	8.7041	$\sin (H + \alpha_0)$	9.9816 <i>n</i>
$\tan \delta_0$	9.6459	$\sec \delta_0$	0.0388
$\log (g)$	8.2190	$\log (h)$	0.1347 <i>n</i>
		$\alpha_0 =$	^h 3 ^m 59 ^s 9.307
		$f =$	+ 0.924
		$(g) =$	+ 0.017
		$(h) =$	- 1.364
		$\tau \mu =$	0.000
		$\alpha =$	^h 3 ^m 59 ^s 8.884
		$\delta_0 =$	[°] +23 ['] 52 ["] 1.59
$\log g$	1.0451	$\log h$	1.2904
$\cos (G + \alpha_0)$	9.9994	$\cos (H + \alpha_0)$	9.4553
		$\sin \delta_0$	9.6070
$\log (g')$	1.0445		
		$\log (h')$	0.3527
		$(i) =$	- 5.64
		$\tau \mu' =$	- 0.01
		$\delta =$	[°] +23 ['] 52 ["] 9.27
$\log i$	0.7903 <i>n</i>		
$\cos \delta_0$	9.9612		
$\log (i)$	0.7515 <i>n</i>		

Page 230 contains for every tenth sidereal day the *Besselian* and *Independent Star-Numbers*, exclusive of all short-period terms. They are useful in computing ephemerides of stars, similar to those on pages 287–486, for which constants containing short-period terms should not be employed.

Pages 231–232 contain for Washington Mean Midnight of each day the short-period terms of the nutation in longitude and obliquity, for use in connection with the formulæ on page 217, and the coefficients mentioned below, which are given for each star on pages 287–486.

Pages 233–250 contain the mean places of eight hundred and twenty-five stars, for the beginning of the Besselian fictitious year, or, in other words, for the moment when the Sun's mean longitude is 280° . The annual variations are to be considered as the differential coefficients of each coordinate with respect to the time at the beginning of the year.

Pages 251–286 contain the apparent positions of fifteen northern circumpolar stars for every upper transit at Washington. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26 is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 251 we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But the lower transit following that of July 1 (page 257) does not take place until July 2.3. Hence the lower transit of July 1 precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column *Mean Solar Date*.

The secant and tangent of the apparent declination for the 15th of each month and the mean place in right ascension and declination for the beginning of the year are given for each star at the foot of the page.

Pages 287–486 contain, for every tenth upper transit at Washington, the apparent places of 800 stars, being all those given in the list of mean places, except the twenty-five circumpolars. The mean solar date in the left-hand column of each page gives the day and tenth of the transit, so that intermediate transits may be readily identified; and to facilitate interpolation, the differences of each coordinate are given for every ten days.

In connection with the ephemeris of each 10-day star there are given at the foot of the page, (1) the secant and the tangent of the mean of the star's greatest and least apparent declinations during the year, (2) the seconds of the mean place in both right ascension and declination for the beginning of the year, and (3) the coefficients of the short-period terms of the nutation, the use of which is explained on page 217.

Pages 487–510 contain ephemerides of ten southern circumpolar stars in all respects similar to those of northern circumpolar stars on pages 251–286.

Pages 511–517 contain the mean errors for 1920 in both right ascension and declination of the places of the 825 stars on pages 233–250 taken from *Astronomical Papers of the American Ephemeris*, Vol. VIII, Part 2, pages 370–382. They furnish data for estimating approximately the accuracy of the Mean Places of the Stars on pages 233–250.

Pages 518–525 contain the *Apparent Right Ascension* and *Declination* of the Sun, both for Washington mean and apparent noon, and the *Hourly Motion* of the Sun in these coordinates; the *Equation of Time*, the *Semidiameter* of the Sun, and the *Sidereal Time of Semidiameter Passing Meridian*, for Washington apparent noon; and, lastly, the *Sidereal Time of Mean Noon*. The hours and minutes of right ascension and the degrees and minutes of declination are always made the same for both mean and apparent noon. In cases where they really differ, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that the sum of the two remains correct. The hourly motions in right ascension and declination are given for the columns headed *Mean Noon*, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the Sun’s center over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich*.

Pages 526–541 contain the right ascension, declination, semidiameter, and parallax of the Moon at the moment of upper and lower transit over the meridian of Washington. The mean time given in the third column is that of transit of the Moon’s center over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington would exceed those given in the column *Mean Time of Transit*, supposing the rate of change to be uniform and equal to what it is at the instant of transit over the meridian of Washington. The next four columns need no especial explanation, except that the differences for one hour of longitude are computed as if the motion of the Moon in right ascension were uniform, or, in other words, they are differential coefficients corresponding to the instants of Washington transit. By means of them, when second differences are taken into account, the position of the Moon can be computed with great exactness for the moment of transit over any meridian not more than one hour distant from Washington. To obtain the same accuracy for more distant meridians, we may proceed as follows: Let F represent either the *Mean Time of Transit*, the *Right Ascension of Center*, or the *Geocentric Declination of Center*, and let D represent the corresponding *Difference for One Hour of Longitude*. Write down three successive values of F , together with the corresponding values of D , and difference the latter as in the following scheme; where the middle values, F_0 and D_0 , belong to the culmination from which is to be derived the value of F for the culmination on the meridian whose longitude is λ :—

Function.	Diff. for 1 Hour of Longitude.	Δ'	Δ''
F_{-1}	D_{-1}	a'	
F_0	D_0	a''	b
F_{+1}	D_{+1}		

Then, for the culmination at the meridian λ

$$F_{\lambda} = F_0 + \lambda D_0 + \frac{\lambda^2}{48}(a' + a'') + \frac{\lambda^3 b}{864}$$

[Eph 13]

where λ must be expressed in hours and decimals of an hour, and reckoned from Washington or from 180° from Washington according as the upper or lower culmination is used for the middle value (F_0). Adding twelve hours to the Washington time of lower transit at Washington gives the local time of upper transit at places whose longitude is 180° from Washington.

The columns of *Sidereal Time of Semidiameter Passing Meridian*, *Geocentric Semidiameter* and *Equatorial Horizontal Parallax* need no explanation, except that they are all given for the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When one limb is full and the terminator is within $1''$ of the opposite limb, both can be well observed, and in such cases both are indicated, the defective limb being indicated by an italic letter or numeral.

Pages 542–558 contain for each of the seven major planets, the geocentric *Apparent Right Ascension* and *Declination*, the *Horizontal Parallax*, *Semidiameter*, and *Sidereal Time of Semidiameter Passing Meridian*, for the moments of all transits which it is usually desirable to observe over the meridian of Washington. The columns following the dates give the Washington mean times of these transits. The stellar magnitude at opposition for Mars, Jupiter, Saturn, Uranus, and Neptune, respectively, is given at the bottom of the page containing the ephemeris of the planet.

PART III.—PHENOMENA.

This part gives the dates of the principal astronomical phenomena of the year, expressed in Washington mean time, except in the case of the eclipses, which are expressed in Greenwich mean time.

Pages 560–565 contain all necessary data respecting the solar and lunar eclipses which occur during the year.

The eclipse elements are given for the moment of conjunction of the Sun and Moon in right ascension, but the subsequent tables and results are computed from the exact positions of these bodies at the several instants referred to. The times and angles designated as the circumstances of a lunar eclipse remain the same throughout all parts of the Earth, and require no explanation beyond a mere statement of the fact that in computing them the geometrical diameter of the Earth's shadow has been augmented in the proportion of 51:50. The principal circumstances of each total and annular eclipse are stated in five lines, as follows:—

The line entitled “Eclipse begins” gives the Greenwich mean time at which the Moon's penumbra first touches the Earth, together with the latitude and longitude of the point of contact.

The line entitled “Central eclipse begins” gives the time when the axis of the Moon's shadow first touches the Earth, and the latitude and longitude of the point of contact follow.

The line entitled “Central eclipse at noon” gives the time when the axes of the Earth and of the shadow cone lie in the same plane. The latitude and longitude of the point where the axis of the shadow cone then cuts the Earth's surface follow, and there the eclipse will be central and the Sun will be exactly on the meridian.

The lines entitled “Central eclipse ends” and “Eclipse ends” give, respectively, the times when and the localities where these events occur, the phenomena being *the converse* of those denoted by the similar phrases for the beginning.

In the case of partial solar eclipses the axis of the Moon's shadow does not come into contact with the Earth, and the three lines entitled, respectively, "Central eclipse begins," "Central eclipse at noon," and "Central eclipse ends," are replaced by a single line entitled "Greatest eclipse," whereon are given the time when and the latitude and longitude where the eclipse attains its greatest magnitude. The latter phenomenon necessarily occurs with the Sun in the horizon.

Maps of the Eclipses.—The regions in which each eclipse is visible are shown upon the map relating to it, from which may be taken approximately, for any place, both the times of the beginning and ending of the eclipse and its magnitude. The dotted curves show the outline of the shadow for each hour of Greenwich mean time, and therefore pass through all places where the eclipse begins or ends at the hour indicated. To find the instant of beginning at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between the corresponding hours of Greenwich mean time; and the fraction of the hour may be determined by dividing the hour in the same proportion as the space representing it on the map is divided by the place in question. This division may be made a little more exact by allowing for the changes in the spaces as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the times at which the eclipse of 1913, April 6, begins and ends near Sitka, Alaska, latitude 57° 0' N., longitude 135° 8' W.

For the beginning we compare the distance of the place from the curves of 4^h and 5^h, and find it to correspond to about 40 minutes from the former, thus giving for the approximate time of beginning 4^h 40^m; for the end we compare the distance of the place from the curves of 6^h and 7^h, and find it to be about 20 minutes from the former, thus giving for the approximate time of ending 6^h 20^m, and both of these results are probably correct to within 3 or 4 minutes.

Changing to local mean time, we shall have—

					<i>Beginning.</i>			<i>Ending.</i>		
					d	h	m	d	h	m
Greenwich mean time	.	.	.	April	6	4	40	6	6	20
Longitude west	.	.	.			9	1		9	1
					<hr/>			<hr/>		
Local mean time	.	.	.	April	5	19	39	5	21	19

In the case of total and annular eclipses, a fair estimate of the magnitude of the eclipse at any place may be obtained from the position thereof relatively to the central line and to the limit. On the central line the eclipse is annular or total, while between the central line and the limit the maximum magnitude of the eclipse is given by the quotient of the distance of the place from the limit divided by the distance of the central line from the limit; the measurements being made upon a line drawn through the place, perpendicularly to the central line.

More Accurate Computations.—A more accurate determination of the phases, as visible at any point of the Earth's surface, may be obtained from the Besselian elements which are given for every 10 minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the center of the Earth, perpendicular to the right line joining the centers of the Sun and Moon. This latter line is the axis of the Moon's shadow, and the plane is called the *fundamental plane* or *plane*

of xy . We take the intersection of this plane with that of the Earth's equator as the axis of x , and the center of the Earth as the origin of coordinates. The axis of y is perpendicular to that of x , and directed toward the north; x and y are then the coordinates of the point in which the axis of the shadow intersects the fundamental plane, and they are here expressed in terms of the Earth's equatorial radius as unity. The angle d , of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the shadow is directed; or, in other words, it is the declination of the center of the Sun as seen from the center of the Moon. The angle μ is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities l_1 and l_2 are the radii of the shadow cones upon the fundamental plane, l_1 corresponding to the penumbra, and l_2 to the umbra, or annulus. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which l_2 is regarded as positive for an annular and negative for a total eclipse.

The angles f_1 and f_2 , the tangents of which are given, are the angles which the elements of the respective shadow cones make with the axis of the shadow; or, they are the semiangles of the two cones.

In order to facilitate interpolation to any required moment, the logarithms of x' , y' , and μ' , which are the changes of x , y , and μ , in one minute of time, are given at the bottom of the table.

The method of computing an eclipse from its Besselian elements is based on the fact that at the moments of beginning and ending the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find this distance and radius we proceed as follows:—

(1) The coordinates of the observer, ξ , η , and ζ , together with their variations in one minute, are computed for some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase.

(2) The coordinates x and y of the axis of the shadow, together with their variations in one minute, are taken for the same moment from the tables of elements.

(3) From (1) and (2) the position and motion of the observer relative to the axis of the shadow are found.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer is also computed.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follows:—

(1) Find $\rho \cos \varphi'$ and $\rho \sin \varphi'$, which are the geocentric coordinates of the station referred to the Earth's equator, ρ being the distance from the center of the Earth and φ' the geocentric latitude. These coordinates may be obtained from geodetic tables, or may be computed from the following table based on CLARKE'S spheroid of 1866, by the formulæ—

$$\begin{aligned}\rho \cos \varphi' &= F \cos \varphi \\ \rho \sin \varphi' &= \frac{\sin \varphi}{G}\end{aligned}$$

φ being, as usual, the geographic latitude.

Table for Computing the Geocentric Coordinates of a Place.

φ	Log F .	Log G .
0°	0.00000 1	0.00295 1
5	0.00001 3	0.00294 3
10	0.00004 6	0.00291 6
15	0.00010 7	0.00285 7
20	0.00017 9	0.00278 9
25	0.00026 11	0.00269 11
30	0.00037 11	0.00258 11
35	0.00048 13	0.00247 13
40	0.00061 13	0.00234 13
45	0.00074 12	0.00221 12
50	0.00086 13	0.00209 13
55	0.00099 12	0.00196 12
60	0.00111 10	0.00184 10
65	0.00121 9	0.00174 9
70	0.00130 8	0.00165 8
75	0.00138 5	0.00157 5
80	0.00143 3	0.00152 3
85	0.00146 1	0.00149 2
90	0.00147	0.00147

For the assumed Greenwich mean time of computation, take from the table of elements the values of $\sin d$, $\cos d$, and μ . Then, with λ for the longitude west from Greenwich, the coordinates of the observer will be—

$$\begin{aligned}\xi &= \rho \cos \varphi' \sin (\mu - \lambda) \\ \eta &= \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (\mu - \lambda) = \eta_1 - \eta_2 \\ \zeta &= \rho \sin \varphi' \sin d + \rho \cos \varphi' \cos d \cos (\mu - \lambda) = \zeta_1 + \zeta_2\end{aligned}$$

and their variations in one minute of mean time will be—

$$\begin{aligned}\xi' &= [7.63992] \rho \cos \varphi' \cos (\mu - \lambda) \\ \eta' &= [7.63992] \rho \cos \varphi' \sin d \sin (\mu - \lambda) = [7.63992] \xi \sin d \\ \zeta' &\text{ is not needed.}\end{aligned}$$

(2) For the same assumed moment of Greenwich mean time, take from the tables of elements the coordinates x and y of the axis of the shadow, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. These variations are represented by x' and y' , and their logarithms are given beneath the tables of x and y .

(3) The distance m and position-angle M of the axis of the shadow relatively to the observer, and the relative motions, n and N , are computed by the formulæ—

$$\begin{aligned}m \sin M &= x - \xi \\ m \cos M &= y - \eta \\ n \sin N &= x' - \xi' \\ n \cos N &= y' - \eta'\end{aligned}$$

(4) Both for the shadow and for the penumbra, the radius L at the distance ζ from the fundamental plane is computed by the formula—

$$L = l - \zeta \tan f$$

l and f being found from the table of elements, and ζ computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or ending of the eclipse, we shall have—

$$\begin{aligned}m &= L \\ &[\text{Eph 13}]\end{aligned}$$

But, as this condition will rarely be fulfilled on a first trial, a correction τ to the assumed time is computed thus: Find the angle ψ from the equation,

$$\sin \psi = \frac{m \sin (M - N)}{L}$$

There will be two values for this angle, of which one will be in the first and the other in the second quadrant when $\sin \psi$ is positive, and one in the third and the other in the fourth quadrant when $\sin \psi$ is negative; but simplicity will be gained by taking only that value of ψ for which $\cos \psi$ is positive. This value lies between the limits $+90^\circ$ and -90° . The correction τ to the assumed time of beginning or ending of the eclipse will then be found, in minutes, from—

$$\tau = - \frac{m \cos (M - N)}{n} \mp \frac{L \cos \psi}{n}$$

where the double sign is to be taken negative for the beginning and positive for the ending.

However, one such pair of values of τ can not give the times of both beginning and ending with accuracy. To attain that, we must commence the computation by assuming two times, one near the beginning and the other near the ending of the eclipse, both of which may be derived from the chart with sufficient exactness. The computation for the first assumed time will give a small value of τ which, when applied to the assumed time, will give the beginning of the eclipse nearly correctly, and a large value which will give an inaccurate time of ending. Similarly the computation for the second assumed time will give a small and nearly correct value of τ for finding the time of ending, and a large and inaccurate negative value for finding the time of beginning. We shall thus deduce two times of each phase, only one of which is to be regarded as approximately correct.

The more accurate times of beginning and ending may now be taken in place of those originally assumed, and the whole computation may be repeated, thus leading to a pair of values of τ , which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors, but a second approximation may be obtained without it, by finding a corrected value of τ in accordance with the formulæ—

$$\delta \tau = \mp \frac{\tau(l' + [5.3100]\xi \cos d)}{n \cos \psi} - \frac{[4.9788]\tau^2}{n \cos \psi} [\xi \sin (N \mp \psi) - \eta_2 \cos (N \mp \psi)]$$

$$\tau_0 = \tau + \delta \tau$$

where the double signs are to be taken negative for the beginning of the eclipse and positive for the ending. l' is the variation of l for one minute of time, and its numerical value can be taken by inspection from the table of Besselian elements.

If the resulting values of τ_0 are not greater than fifteen minutes, the corrected times of contact thus obtained will be theoretically exact within less than a second, but the uncertainties of the solar and lunar tables are such that an unavoidable error of several seconds may exist in the prediction. To guard against numerical mistakes it is better, after making this final correction, to repeat the computations so far as to obtain new values of m and L for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed *are generally correct* within a second of time. If they differ too widely, the *computer must use his own judgment as to making further corrections and computations.*

Position-angle of Point of Contact.—The position-angle P , of the point of contact, reckoned from the north point of the Sun's limb toward the east, is found by the formulæ—

$$P = N - \psi \pm 180^\circ \text{ for the beginning,}$$

or
$$P = N + \psi \quad \text{for the ending,}$$

it being assumed that, in each case, the value of ψ is taken between the limits $\pm 90^\circ$.

Computation of the Solar Eclipse of 1913, April 6, for a point at Sitka, Alaska.

The position of the point chosen is—

Latitude, $\varphi = + 57 \quad 0 \quad 0$
Longitude, $\lambda = + 135 \quad 8 \quad 0$

and its geocentric coordinates are—

$$\rho \sin \varphi' = 9.92168$$

$$\rho \cos \varphi' = 9.73715$$

From the Eclipse Chart we find the approximate times of the phases to be—

Beginning April	^d 6	^h 4	^m 40	} Greenwich Mean Time.
Ending	6	6	20	

Greenwich Mean Time, T , April 6,	Beginning.			Ending.		
	^h 4	^m 40		^h 6	^m 20	
μ	69	21	48	94	22	12
λ	+ 135	8	0	+ 135	8	0
$\mu - \lambda$	— 65	46	12	— 40	45	48
$\rho \cos \varphi'$	9.73715			9.73715		
$\sin (\mu - \lambda)$	9.95995 n			9.81487 n		
$\log \xi$	9.69710 n			9.55202 n		
ξ	— 0.49786			— 0.35647		
$\rho \sin \varphi'$	9.92168			9.92168		
$\cos d$	9.99728			9.99726		
$\log \eta_1$	9.91896			9.91894		
η_1	+ 0.82978			+ 0.82974		
$\rho \cos \varphi'$	9.73715			9.73715		
$\sin d$	9.04724			9.04894		
$\cos (\mu - \lambda)$	9.61320			9.87933		
$\log \eta_2$	8.39759			8.66542		
η_2	+ 0.02498			+ 0.04628		
$\eta = \eta_1 - \eta_2$	+ 0.80480			+ 0.78346		
$\rho \sin \varphi' \sin d$	8.96892			8.97062		
ζ_1	+ 0.09309			+ 0.09346		
$\rho \cos \varphi' \cos d \cos (\mu - \lambda)$	9.34763			9.61374		
ζ_2	+ 0.22265			+ 0.41090		
$\zeta = \zeta_1 + \zeta_2$	+ 0.31574			+ 0.50436		
const. log	7.63992			7.63992		
$\rho \cos \varphi' \cos (\mu - \lambda)$	9.35035			9.61648		
$\log \xi'$	6.99027			7.25640		

	Beginning.	Ending.
ξ'	+ 0.000978	+ 0.001805
const. log	7.63992	7.63992
$\xi \sin d$	8.74434 <i>n</i>	8.60096 <i>n</i>
log η'	6.38426 <i>n</i>	6.24088 <i>n</i>
η'	− 0.000242	− 0.000174
$x - \xi$	− 0.52217	+ 0.09217
$y - \eta$	+ 0.14046	+ 0.56620
$x' - \xi'$	+ 0.006578	+ 0.005753
$y' - \eta'$	+ 0.004288	+ 0.004216
$m \sin M$	9.71781 <i>n</i>	8.96459
$m \cos M$	9.14755	9.75297
tan M	0.57026 <i>n</i>	9.21162
M	− 74° 56' 40''	+ 9° 14' 45''
sin M	9.98483 <i>n</i>	9.20593
log m	9.73298	9.75866
$n \sin N$	7.81809	7.75989
$n \cos N$	7.63225	7.62490
tan N	0.18584	0.13499
N	+ 56° 54' 4''	+ 53° 45' 53''
sin N	9.92310	9.90666
log n	7.89499	7.85323
tan f	7.66941	7.66940
log ζ	9.49933	9.70274
	7.16874	7.37214
$\zeta \tan f$	+ 0.00147	+ 0.00236
l	+ 0.56512	+ 0.56498
L	+ 0.56365	+ 0.56262
$M - N$	+ 228° 9' 16''	− 44° 31' 8''
sin ($M - N$)	9.87212 <i>n</i>	9.84581 <i>n</i>
log m	9.73298	9.75866
colog L	0.24899	0.24978
sin ψ	9.85409 <i>n</i>	9.85425 <i>n</i>
ψ	− 45° 36' 50''	− 45° 38' 9''
log $\frac{m}{n}$	1.83799	1.90543
cos ($M - N$)	9.82421 <i>n</i>	9.85310
	1.66220 <i>n</i>	1.75853
$-\frac{m}{n} \cos (M - N)$	+ 45.941	− 57.350
log L	9.75101	9.75022
cos ψ	9.84478	9.84461
colog n	2.10501	2.14677
	1.70080	1.74160

	Beginning.	Ending.
$\mp \frac{L \cos \psi}{n}$	- 50.211	+ 55.157
τ	- 4.270 ^m	- 2.193 ^m
$T + \tau$	^d 6 ^h 4 ^m 35.730	^d 6 ^h 6 ^m 17.807

Since the value of τ for the beginning is rather large, we compute the correction $\delta\tau$ for this phase as follows:

	Beginning.		Beginning.
const. log	5.3100	$\cos (N - \psi)$	9.3359 <i>n</i>
log ξ	9.6971 <i>n</i>	log η_2	8.3976
cos <i>d</i>	9.9973	log $\eta_2 \cos (N - \psi)$	7.7335 <i>n</i>
	5.0044 <i>n</i>	$\xi \sin (N - \psi)$	- 0.4861
number	- 0.0000101	$\eta_2 \cos (N - \psi)$	- 0.0054
<i>l'</i>	- 0.0000010	diff.	- 0.4807
sum	- 0.0000111		
log (sum)	5.0453 <i>n</i>	log (diff.)	9.6819 <i>n</i>
log (- τ)	0.6304	const. log	4.9788 <i>n</i>
colog <i>n</i>	2.1050	log τ^2	1.2608
sec ψ	0.1552	colog (<i>n</i> cos ψ)	2.2602
	7.9359 <i>n</i>		8.1817
(1)	- 0.0086	(2)	+ 0.0152
$N - \psi$	102° 31'		
sin ($N - \psi$)	9.9896	(1) + (2) = $\delta\tau$	+ 0.0066 ^m
log ξ	9.6971 <i>n</i>	τ	- 4.270
log $\xi \sin (N - \psi)$	9.6867 <i>n</i>	τ_0	- 4.263

The corrected time of beginning is, therefore,
 $T_0 = \text{April } 6^{\text{d}} 4^{\text{h}} 35^{\text{m}}.737$

Whence we find—

		Beginning.	Ending.
Greenwich Mean Time,	April	^d 6 ^h 4 ^m 35.737	^d 6 ^h 6 ^m 17.807
λ		+ 9 0.533	+ 9 0.533
Local Mean Time,	April	5 19 35.204	5 21 17.274

Therefore we have—

Beginning of the Eclipse,	April	^d 5 ^h 19 ^m 35 ^s 12.2	} Local Mean Time.
End of the Eclipse,	April	5 21 17 16.4	

	Beginning.	Ending.
	° ,	° ,
$N \mp \psi$	102 30.9	8 7.7
constant	180 0.0	0 0.0
Angle of position: <i>P</i>	282 30.9	8 7.7

from the north point of the Sun's disk toward the east for direct image.

Pages 566–569 contain the adopted mean places and annual proper motions of such stars as bright as magnitude 6.5 as will be occulted during the year by the Moon.

Pages 570–604 contain the elements for the prediction of the times of occultations of stars and planets by the Moon during the current year. The system of coordinates employed is similar to that already described for eclipses, the fundamental plane passing through the center of the Earth, and being taken perpendicular to the line joining the star and the center of the Moon, but the cone circumscribing the Moon and star is regarded as a cylinder which intercepts the fundamental plane in a circle having the same linear diameter as the Moon.

In the columns referring to the star, those headed *Red'ns from 1913.0* give the quantities necessary to reduce the mean place of the star at the beginning of 1913 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

Under the general head, *At Conjunction in R. A.*, are five columns giving certain quantities for the moment of geocentric conjunction of the Moon and star in right ascension, as follows:

The *Washington Mean Time* is the moment, T , at which the two bodies are in geocentric conjunction in right ascension. At that moment the coordinate x of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour Angle, H* , gives the common geocentric hour-angle of the Moon and star at the same moment, expressed in sidereal time and counted from the meridian of Washington—positive toward the west and negative toward the east. Column Y gives the coordinate y of the axis of the cylinder upon the fundamental plane at the same moment. Columns x' and y' give the variations of x and y in one hour of mean time. The linear unit in these columns is the Earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star relatively to the limb of the Moon may be computed for any part of the Earth by a method nearly the same as that already explained for computing eclipses, but somewhat more simple.

Prediction of Occultations for a given Place.—When it is desired to predict the circumstances of one or more occultations at any place, the first step will be to select them from the general list given in the Ephemeris. The conditions of visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.
2. The quantity $H - \lambda$, taken without regard to sign, must be less than the semidiurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east, or an immersion in the west, when this difference is a few minutes less than an hour.
3. The Sun must not be much more than an hour above the horizon at the local mean time $T - \lambda$, unless the star is bright enough to be seen in the daytime.

When many occultations are to be selected, the most convenient course will be to write the value of $-\lambda$ on the bottom of a slip of paper, and in passing through the list of occultations, to pause over each one for which condition (1) is fulfilled, and examine by means of the slip whether conditions (2) and (3) are also fulfilled. If either fails, the computer passes on. Sometimes it will be difficult to determine whether $H - \lambda$ or $T - \lambda$ falls within the limits; and in such cases the computer may

mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

The next step will be to compute the local times of immersion and emersion from the elements, and to that end let—

T = the instant of geocentric conjunction of Moon and star in right ascension, expressed in Washington mean solar time;

H = the Washington west hour-angle of the two bodies at that moment;

λ = the longitude west of Washington;

$h_0 = H - \lambda$ = the local hour-angle of the star at the instant T ;

δ = the star's declination.

The procedure for each occultation will then be as follows:—

(1) The geocentric coordinates of the place, $\rho \sin \varphi'$ and $\rho \cos \varphi'$, are to be computed by the formulæ and table given in connection with eclipses on page 716.

The next step will be to find the approximate instant of apparent conjunction of the Moon and star as seen from the place, and that may be deduced from the time of geocentric conjunction by the application of an approximate correction taken from Mr. DOWNES's table, printed in the volumes of the American Ephemeris for 1882 to 1899. This correction must be reckoned in mean solar hours, and will be designated by the symbol t . It will have the same sign as h_0 .

When DOWNES's table is not available, the correction may be computed from the formulæ,

$$\xi_0 = \rho \cos \varphi' \sin h_0$$

$$\xi' = [9.4192] \rho \cos \varphi' \cos \frac{4}{3} h_0$$

$$t = \frac{\xi_0}{x' - \xi'}$$

By applying t to the Washington mean time of geocentric conjunction, as given with the elements, we shall have the Washington mean time of local conjunction within a few minutes.

(2) Compute for the instant $T + t$ the following quantities, in which t_0 is the sidereal equivalent of the mean time interval t :

$$\xi = \rho \cos \varphi' \sin (h_0 + t_0)$$

$$\eta = \rho \sin \varphi' \cos \delta - \rho \cos \varphi' \sin \delta \cos (h_0 + t_0) = \eta_1 - \eta_2$$

$$\xi' = [9.4192] \rho \cos \varphi' \cos (h_0 + t_0)$$

$$\eta' = [9.4192] \rho \cos \varphi' \sin \delta \sin (h_0 + t_0) = [9.4192] \xi \sin \delta$$

$$x = x' t$$

$$y = Y + y' t$$

Compute also m , M , n , N , and ψ from the equations,

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

$$\sin \psi = [0.5646] m \sin (M - N)$$

ψ being taken between the limits $\pm 90^\circ$. Finally compute,

$$\tau = -\frac{[1.7782]m}{n} \cos (M-N) \mp \frac{[1.2135]}{n} \cos \psi$$

$$\delta\tau = \frac{[6.7591]\tau^2}{n \cos \psi} [\eta_2 \cos (N \mp \psi) - \xi \sin (N \mp \psi)]$$

where the double signs are to be taken negative for an immersion and positive for an emersion. Both τ and $\delta\tau$ thus have two values, which are expressed in minutes of time, and in order to distinguish them let those pertaining to immersion be designated respectively τ' and $\delta\tau'$, while those pertaining to emersion are designated τ'' and $\delta\tau''$. We then have for the Washington mean times of the phases,

$$\text{Instant of immersion} = T + t + \tau' + \delta\tau'$$

$$\text{Instant of emersion} = T + t + \tau'' + \delta\tau''$$

These expressions are practically exact, as the corrections $\delta\tau$ seldom amount to so much as 1.5 minutes, and whenever an inaccuracy of that magnitude is permissible they may be omitted. As a check upon the results, it will be advisable to compute ξ , η , x , and y for the times of immersion and emersion finally obtained. If these times are correct the quantities in question will fulfill the condition,

$$\sqrt{(x-\xi)^2 + (y-\eta)^2} = 0.2725$$

If $\log m \sin (M-N) > 9.4354$, $\sin \psi$ will be numerically greater than unity, and no occultation is to be expected at the given place; but a very brief one may occur if the excess of the computed distance over the Moon's semidiameter happens to be within the errors of the ephemerides of the Moon and star.

The position-angle of the line from the Moon's center to the star, at the time of contact, is reckoned from the north point toward the east, and designated by the symbol P . It is computed from the formulæ,

$$P = N - \psi + \delta P \quad \text{for immersion,}$$

$$\text{or} \quad P = N + \psi + \delta P \pm 180^\circ \text{ for emersion,}$$

where the angles $N - \psi$ and $N + \psi$ are taken directly from the computation of $\delta\tau$, and δP is found in degrees of arc from the expression,

$$\delta P = \mp \frac{[7.3038]\tau^2}{\cos \psi} [\eta_2 \sin N + \xi \cos N]$$

In the latter formula the double sign is to be taken negative for an immersion and positive for an emersion.

The angle from the vertex, V , is also reckoned in the direction from the north toward the east, and is found from the formula,

$$V = P - C$$

where C is computed from the expression,

$$\tan C = \frac{\xi + [8.2218]\tau\xi' - [4.9810]\tau^2\xi}{\eta + [8.2218]\tau\eta' + [4.9810]\tau^2\eta_2}$$

C being taken less or greater than 180° , according as the numerator is positive or negative.

The value of τ employed in the latter formula must be so taken as to correspond with the phase for which C is required.

In the volumes of the American Ephemeris for the years 1882 to 1901 instructions are given for constructing three special tables which greatly diminish the labor of computing occultations, but as these tables should contain from 4700 to 6300 quantities, and as they would apply only to the place for which they were computed, it will rarely be worth while to undertake the labor of forming them. Those who desire further information on the subject may consult any one of the volumes in question.

As an example of an isolated occultation, we will compute that of η Tauri (*Alcyone*) on December 11, 1913, for Baltimore, whose position is—

$\varphi = +39^{\circ} 17' 48''$
 $\lambda = -0^{\text{h}} 1^{\text{m}} 49^{\text{s}}.8$

and whose geocentric coordinates are—

$\rho \sin \varphi' = 9.7993$
 $\rho \cos \varphi' = 9.8893$

From the elements on page 602 we have,

$T = \begin{matrix} \text{h} & \text{m} \\ 5 & 1.7 \end{matrix}$
 $H = -5 \ 20.7$
and $h_0 = H - \lambda = -5 \ 18.9$

From the formulæ on page 723, we find the correction, t , to the Washington mean time of geocentric conjunction, T , to be about $-1^{\text{h}} 15^{\text{m}}.5$; therefore the Washington mean time of apparent conjunction is—

$T + t = \text{December } 11^{\text{d}} 3^{\text{h}} 46^{\text{m}}.2.$

η Tauri (<i>Alcyone</i>).	Apparent Declination.	W. T. of δ	Hour Angle.	Y	x'	y'
	δ	$\text{d} \quad \text{h} \quad \text{m}$	$\text{h} \quad \text{m}$			
	+23 50.6	Dec. 11 5 1.7	-5 20.7	+0.7012	0.5489	+0.1451

$T + t$	Dec. 11 ^d 3 ^h 46 ^m .2	η_2	-0.0471
h_0	-5 18.9	$\eta_1 - \eta_2 = \eta$	+0.6232
t_0	-1 15.7	const. log	9.4192
$h_0 + t_0$	-6 34.6	$\rho \cos \varphi' \cos (h_0 + t_0)$	9.0665 <i>n</i>
$\rho \cos \varphi'$	9.8893	log ξ'	8.4857 <i>n</i>
$\sin (h_0 + t_0)$	9.9950 <i>n</i>	ξ'	-0.0306
log ξ	9.8843 <i>n</i>	const. log	9.4192
ξ	-0.7661	$\xi \sin \delta$	9.4909 <i>n</i>
$\rho \sin \varphi'$	9.7993	log η'	8.9101 <i>n</i>
cos δ	9.9612	η'	-0.0813
log η_1	9.7605	log x'	9.7395
η_1	+0.5761	log t	0.0998 <i>n</i>
$\rho \cos \varphi'$	9.8893	log x	9.8393 <i>n</i>
sin δ	9.6066	x	-0.6907
cos $(h_0 + t_0)$	9.1772 <i>n</i>	log y'	9.1617
log η_2	8.6731 <i>n</i>	log $y't$	9.2615 <i>n</i>

$T+t$ Dec. 11 ^d	3 ^h 46 ^m .2	const. log	0.5646
$y't$	-0.1826	log m	9.1104
Y	+0.7012	$\sin (M-N)$	9.9860
y	+0.5186	$\sin \psi$	9.6610
$x-\xi$	+0.0754	ψ	+27° 16'
$y-\eta$	-0.1046	const. log	1.7782
$x'-\xi'$	+0.5795	$\log \frac{m}{n}$	9.3165
$y'-\eta'$	+0.2264	$\cos (M-N)$	9.3971
$m \sin M$	8.8774		0.4918
$m \cos M$	9.0195 n	$-\frac{[1.7782]m}{n} \cos (M-N)$	- 3.10
$\tan M$	9.8579 n	const. log	1.2135
M	+144° 13'	colog n	0.2061
$\cos M$	9.9091 n	$\cos \psi$	9.9488
log m	9.1104		1.3684
$n \sin N$	9.7631	$\mp \frac{[1.2135] \cos \psi}{n}$	∓ 23.36
$n \cos N$	9.3549	τ for immersion	- 26.46 ^m
$\tan N$	0.4082	τ for emersion	+20.26
N	+68° 40'		
$\sin N$	9.9692		
log n	9.7939		

The computation of $\delta\tau$ for the two contacts is as follows:

	Immersion.	Emersion.
$N \mp \psi$	41° 24'	95° 56'
$\cos (N \mp \psi)$	9.8751	9.0144 n
log η_2	8.6731 n	8.6731 n
log (1)	8.5482 n	7.6875
(1)	-0.0353	+0.0049
$\sin (N \mp \psi)$	9.8204	9.9977
log ξ	9.8843 n	9.8843 n
log (2)	9.7047 n	9.8820 n
(2)	-0.5066	-0.7621
(1) - (2)	+0.4713	+0.7670
log [(1) - (2)]	9.6733	9.8848
const. log	6.7591	6.7591
log τ^2	2.8452	2.6133
colog ($n \cos \psi$)	0.2573	0.2573
log $\delta\tau$	9.5349	9.5145
$\delta\tau$	+ 0.34 ^m	+ 0.33 ^m
$\tau + \delta\tau$	- 26.12	+ 20.59
$T+t$ Dec. 11 ^d 3 ^h 46 ^m .2	3 ^h 46 ^m .2	
Washington Mean Time of Phase, " 11 3 20.1	4 6.8	
λ -0 1.8	-0 1.8	
Baltimore Mean Time, Dec. 11 3 18.3	4 5.0	

To find δP and P :

$\log \eta_2$	8.6731 <i>n</i>	$\log \xi$	9.8843 <i>n</i>	(3)	− 0.0439
$\sin N$	9.9692	$\cos N$	9.5610	(4)	− 0.2788
$\log (3)$	8.6423 <i>n</i>	$\log (4)$	9.4453 <i>n</i>	(3) + (4)	− 0.3227
		Immersion.		Emersion.	
$\log [(3) + (4)]$		9.5088 <i>n</i>		9.5088 <i>n</i>	
const. log		7.3038 <i>n</i>		7.3038	
$\log \tau^2$		2.8452		2.6133	
colog $\cos \psi$		0.0512		0.0512	
$\log \delta P$		9.7090		9.4771 <i>n</i>	
		°		°	
δP		+ 0.5		− 0.3	
$N \mp \psi$		41.4		95.9	
constant		0.0		180.0	
Angle of position: P		41.9		275.6	

from the north point of the Moon's limb toward the east, for direct image.

Pages 605–606 contain in detail all the data necessary for observing every occultation of the general list which is visible at Washington during the current year.

Page 607 contains the *Ephemeris for Physical Observations of the Sun*.

Pages 608–615 contain the *Ephemeris for Physical Observations of the Moon*. The selenographic longitudes are measured in the plane of the Moon's equator, the axis of reference being the radius of the Moon which passes through the mean center of the visible disk, positive toward the west—i. e., toward Mare Crisium—and the latitudes are measured from the Moon's equator, positive toward the north—i. e., in the hemisphere containing Mare Serenitatis.

The optical and physical librations in longitude and latitude have been computed with elements and formulæ given on pages xi and xii, and their sums are given in the second and third columns respectively, the physical libration being given separately in the fourth and fifth columns. The Sun's selenographic colongitude ($90^\circ -$ longitude) and latitude and the position-angle of the Moon's axis, C , in the sixth, seventh, and eighth columns, respectively, have all been corrected for the effect of physical libration.

When the libration in longitude is positive, the mean center of the disk is displaced toward the east—that is, the region thus exposed to view is on the west limb—and when the libration in latitude is positive the mean center of the disk is displaced toward the south—that is, the region thus exposed to view is on the north limb.

The altitude of the Sun, A , at any given time above the horizon of any point on the Moon whose selenographic longitude and latitude, λ and β , are known, may be computed from the following formula, the Sun's selenographic longitude and latitude being denoted by l_\odot and b_\odot , respectively:

$$\sin A = \sin b_\odot \sin \beta + \cos b_\odot \cos \beta \cos (l_\odot - \lambda)$$

Pages 616–617 contain the data with reference to the illuminated disks of Mercury and Venus. The angle θ is the angle which the arc of the great circle from the planet to the Sun makes with the arc from the planet toward the west,

measured in the direction west, north, east, south. It is measured from 0° to 360° . We may also regard θ as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

Pages 618–621 contain the *Ephemeris for Physical Observations of Mars*. The quantities here given have been corrected for aberration, so that in using them they should be interpolated to the actual time of observation.

P is the position-angle of the axis of rotation measured eastward from the north point of the disk.

A_\oplus and A_\odot are the planetocentric right ascensions of the Earth and Sun, respectively, measured in the plane of the planet's equator from its vernal equinox.

D_\oplus and D_\odot are the planetocentric declinations of the Earth and Sun, respectively, referred to the planet's equator.

\odot_\oplus is the planetocentric longitude of the Sun measured in the plane of the planet's orbit from its vernal equinox.

k is the ratio of the area of the illuminated portion of the apparent disk to the area of the entire apparent disk regarded as circular.

i is the angle between the Sun and the Earth as seen from the planet.

q is the angular value of the greatest defect of illumination as seen from the Earth.

Q is the position-angle of the radius of the disk which passes through the point of greatest defect of illumination—that is, of the radius perpendicular to the line joining the cusps. It is measured eastward from the north point of the disk.

The column headed *Central Meridian* contains the longitude of the meridian which bisects the disk, measured from the adopted zero meridian.

The columns headed *Transit of Zero Meridian* contain the Washington Mean Time of every transit of the zero meridian across the actual center of the disk.

Page 622 contains, for the *Satellites of Mars*, the diagram of their orbits and the times of their elongations.

Pages 623–626 contain the *Ephemeris for Physical Observations of Jupiter*.

The columns headed *Central Meridian* contain the longitudes of the meridian which bisects the disk, measured from the adopted zero meridians for the equatorial region and from the meridian of the Great Red Spot, respectively.

The column headed *Correction for Phase* contains the corrections to be applied to the longitudes of the central meridian to obtain the longitudes of the meridian bisecting the illuminated disk.

The column headed *Transit of Zero Meridian* contains the Washington Mean Time of every fifth transit of the zero meridian across the center of the illuminated disk.

The column headed *Transit of Great Red Spot* contains the Washington Mean Time of every fifth transit of the meridian through the Great Red Spot across the center of the illuminated disk.

The remaining quantities used on pages 623–624 are the same as those defined under the *Ephemeris for the Physical Observations of Mars*.

Pages 627–655 contain, concerning the *Satellites of Jupiter*, the diagram of the orbits of Satellites I–V, the times of conjunction of Satellites I–IV, the times of

elongation of Satellite V, the differences in right ascension and declination between Jupiter and Satellites VI and VII, and the phenomena of the Satellites I-IV together with their configurations.

Page 656 contains the *Magnitude of Saturn* and the *Elements of the Rings*.

Pages 657-663 contain, concerning the *Satellites of Saturn*, the diagram of the orbits of the seven inner satellites, the times of elongation for the first eight satellites, the differences in right ascension and declination between Saturn and Phœbe, the ninth satellite, and tables for predicting the position-angles and distances from the center of the planet of the first eight satellites.

Page 664 contains the diagram of the orbits of the satellites of Uranus, together with the times of their elongations.

Pages 665-666 contain tables for predicting the position-angles and distances from the center of the planet of the satellites of Uranus and Neptune.

Page 667 contains the diagram of the orbit of the satellite of Neptune, together with the times of its elongations.

Pages 668-669 contain the *Phenomena*. The predicted times of the conjunctions, quadratures, and oppositions of the planets with respect to the Sun are, respectively, the instants when the longitude of each planet differs from that of the Sun by 0° , $\pm 90^\circ$, or 180° . For the conjunction of the planets with the Moon and with each other the predicted times are the instants when the two bodies have the same right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

Pages 670-679 contain the *Positions of Observatories*. These have been compiled from various sources, and the data used are the best immediately available. The tabular arrangement is self-explanatory.

Page 680 contains two examples in the computation of lunar distances, which are inserted because the lunar distance tables have been omitted from the American Ephemeris since 1911.

Pages 681-699 contain a series of tables numbered from I to VI.

Table I—*For Finding the Latitude by an Observed Altitude of Polaris*.

Table II—*For converting Sidereal into Mean Solar Time*.

Table III—*For converting Mean Solar into Sidereal Time*.

Table IV—*For finding the Azimuth of Polaris at All Hour Angles*.

Table V—*For finding the Azimuth of Polaris at Elongation*.

Table VI—*For Finding the Times of Upper and Lower Culmination of Polaris*.

The following-named persons were engaged in the preparation of the American Ephemeris and Nautical Almanac for the year 1913:

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